PUBLIC WORKS

Aug. 1954

CITY, COUNTY AND STATE

A SERIES OF SPECIAL RTICLES ON SNOW, ICE AND OLD WEATHER PROCEDURES. AGES . . . 67, 70, 72, 78 & 83

luorescent Mercury Vapor Lighting . . . 81

quipment for Sewer Maintenance 86

lew Type Traffic Separating Bars . . . 89

Weed Killers for Ditch Maintenance 95

Waterborne Diseases Reported by PHS . . 132

COMPLETE CONTENTS LIST ON PAGE 5

C. W. Hamblin, Superintendent of Public Works of Mason City, Iowa. The photo, taken last Spring, is appropriate for this "Getting Ready for Winter" issue. See page 18 for more data.

Hydro-Trencher puts the squeeze on tough soil!

Working in conditions like this won't slow down the Oliver 88WT Hydro-Trencher. It digs through rocky soil, roots or hard clay fast and clean. Hydraulic down pressure does all the work. The bucket is *forced* full in the toughest going. Two completely separate hydraulic circuits keep pressure on every maneuver, even when you perform two operations at once. You've got working power all the way—to speed your work, to boost your production.

A one-man rig, the 88WT is ready to work or move in a moment. Its half-yard capacity and rubber-tired mobility cut hours and dollars from any job. Its compact design and delicate hydraulic control let you work next to pipes, walls, foundations, without fear of damage. The rugged, hydraulic stabilizer blade holds the unit level and steady, and also doubles as a backfiller blade. And here's a bonus feature, turn the trenching bucket around, in minutes you have a swing loader with all the power features of the trencher.

For more profit, put the squeeze on your trenching or loading operations with the Oliver 88WT Hydro-Trencher. Visit your Oliver Industrial Distributor for a demonstration.

OPERATING FEATURES
OLIVER 88WT HYDRO-TRENCHER AND SWING LOADER COMBINATION

- **One-half yard bucket**
- **Digs to 10 feet (12 feet with optional boom cylinder)**
- **Loads to 10½ feet (12 feet with optional loading bucket)**
- **200° boom swing**

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois

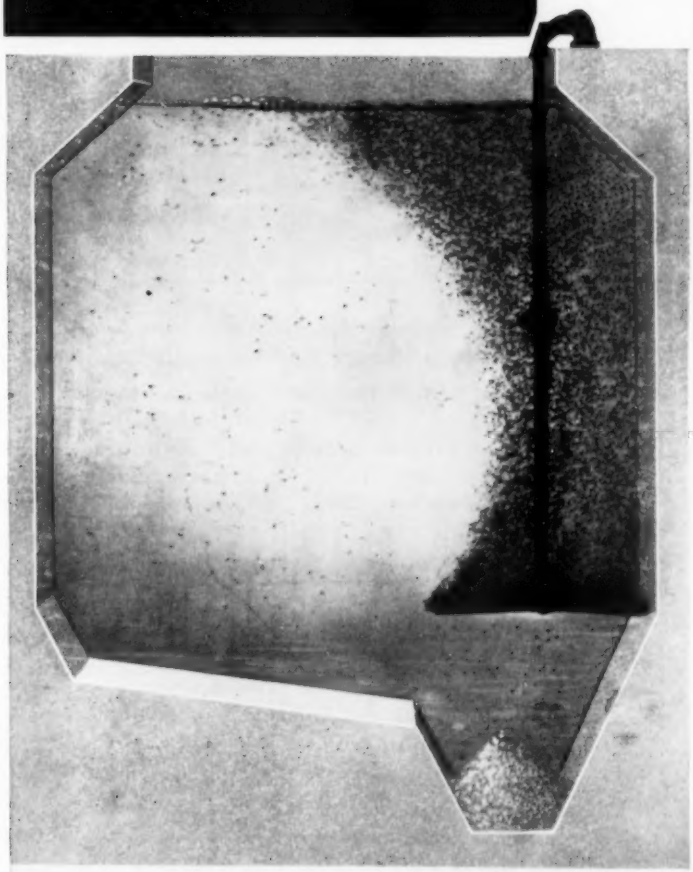
a complete line of industrial wheel and crawler tractors

AER-DEGRITTER*

- **Positive Grit Removal and Washing**
- **Air Controlled Settling Velocities Independent of Flow**

Here's the grit removal system that gives you superior performance *plus* the advantage of low installation and maintenance costs. Only a simple structure is required —grit is cleaned so thoroughly that separate washing tanks are not required. Because there is no mechanical equipment that can be clogged by coarse sewage matter, the Aer-Degritter* can be located ahead of all pumps and other mechanical equipment. Tests made on grit removal by Aer-Degritters* have consistently shown *less* than 0.05% putrescibles. Easy-to-clean Swing Diffusers and Precision Tubes permit easy access to the grit hopper, and allows cleaning without taking the tank out of service.

Extremely flexible in operation, the Aer-Degritter* can maintain proper settling velocities regardless of the rate of sewage flow.



CHICAGO SEWAGE EQUIPMENT

The Aer-Degritter* diffuses air into the grit tank to control sewage velocities at the bottom of the tank, allowing grit to settle out *without organics*. This principle of air controlled velocities was first demonstrated in sewage treatment plants designed by the office of Charles H. Hurd, Consulting Engineer. The Hurd method was an improvement over the then practiced means of controlling grit tank velocities. The Aer-Degritter* is, in turn, an improvement on the Hurd method.

OVER 60 AER-DEGRITTERS* IN OPERATION IN LARGE AND SMALL PLANTS

Aer-Degritter* Systems may be installed in existing structures at the head end of pre-aeration and grease removal tanks. Other applications include use in wet wells of lift stations for grit and odo removal and in power plant and wate works intakes.

**The application of the equipment, as well as the equipment itself is covered by U.S. Patents No. 2,532,457, No. 2,144,385, No. 2,328,655 and No. 2,555,201.*

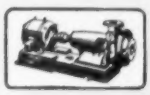
Write for Engineering Data

CHICAGO PUMP COMPANY

SEWAGE EQUIPMENT DIVISION

622 DIVERSEY PARKWAY • CHICAGO 14, ILLINOIS

Flush Kleen, Scru-Peller, Plunger, Horizontal and Vertical Non-Clogs Water Seal Pumping Units, Samplers



Swing Diffusers, Stationary Diffusers, Mechanical Aerators, Combination Aerator-Clarifiers, Comminutors.

Now's the time to mail this month's Readers' Service card.

BEST WAY TO BEAT THE BUDGET SQUEEZE

...get BONDED BUY used equipment

You can rely on "BONDED BUY" used Caterpillar-built machines. Your Caterpillar Dealer backs each with a $10,000 guarantee!

DON'T GUESS OR GAMBLE--- Only your Caterpillar Dealer offers a $10,000 bond on used equipment

Your Caterpillar Dealer offers you three clear-cut classes of used equipment. He backs each one in writing. You buy with confidence, sure that the equipment is honestly described. See him for the best values on the market!

(1) **"BONDED BUY."** Only the best in used Caterpillar-built equipment. Each "BONDED BUY" machine is backed by a Dealer's Guarantee Bond equal to the purchase price of the machine up to a maximum of $10,000. This provides a guarantee for thirty days against unsatisfactory performance due to defective parts. If a part should prove defective within the guarantee period under the normal conditions of your job and with proper maintenance, your dealer will put your machine back into operating condition *with no charge to you for parts and labor* up to the amount of the bond. The Dealer's Guarantee Bond is backed by The Travelers Indemnity Company. Your Caterpillar Dealer gives you this protection, at no extra cost, with your purchase of a "BONDED BUY" machine. Look for the "BONDED BUY" symbol —your assurance of the best in used equipment.

(2) **"CERTIFIED BUY."** The second classification of used equipment. "Certified Buy" covers machines of any make in good condition. Your performance guarantee is in writing backed by your Caterpillar Dealer.

(3) **"BUY AND TRY."** Bargains in used machines of any make. Buy and try them for a period mutually agreed upon by you and your Caterpillar Dealer. "Buy and Try" machines carry his written "money-back" agreement.

"BONDED BUY" assurance effective in the United States and Canada

Copyright 1954, Caterpillar Tractor Co.

More work to be done than dollars to be had . . . is this the usual situation in your department?

To meet it, your Caterpillar Dealer is making an unusual offer—a "BONDED BUY" on used Caterpillar-built equipment, backed by a bond of $10,000 issued by The Travelers Indemnity Company. For the first time in the heavy-duty machinery field, city and road officials are protected in this way.

You also have your choice of two other classes of used equipment buys—"Certified Buy" and "Buy and Try"—which cover used units of *any* make.

This means that jobs deferred for lack of money to buy new machines can now be handled within your budget by motor graders, tractors, bulldozers, scrapers and engines that have their dependability guaranteed in writing.

Only your Caterpillar Dealer makes this offer. Always the best source of new machines for any municipal or governmental job, he's also the best source of used machines. Give him a call today for complete details.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

REG. U. S. PAT. OFF.

BEST BUYS IN NEW AND USED EQUIPMENT

DIESEL ENGINES · TRACTORS · MOTOR GRADERS · EARTHMOVING EQUIPMENT

OFFICERS

W. A. Hardenbergh, *President*
L. C. Morris, *V. Pres. and Treas.*
Edward B. Rodie, *Secretary*

EDITORIAL DEPARTMENT

Editors
A. Prescott Folwell
W. A. Hardenbergh

Managing Editor
Edward B. Rodie

Editorial Assistant
Helen E. Quinn

Columnists
George E. Symons
Leo J. Ritter, Jr.

Art Consultant
Nathaniel Pousette-Dart

BUSINESS DEPARTMENT

Business Manager
L. C. Morris

Director, Advertising and Research
Arthur K. Akers

Production Supervisor
I. James Barger

ADVERTISING OFFICES

New York 17, 310 East 45th St.
L. C. Morris, Eastern Sales Mgr.
W. S. Morris

Cleveland 10, Ohio, Villa Beach 2, 15445 Lake Shore Blvd.
Burton M. Yost, District Mgr.

Chicago 11, Ill. 612 N. Michigan Ave.
Robert J. Shea, Mid-West Sales Mgr.

Los Angeles 36, Calif. 505 S. Alendale Ave.
Hugh Hollyday, % *Smith & Hollyday*

San Francisco 4, Calif. Russ Building
Bill Smith, % *Smith & Hollyday*

NBP BPA

Public Works T. M. Reg. U.S. Pat. Off.

Established 1896

Published Monthly by Public Works Journal Corporation. Office of Publication at Orange, Conn. Editorial and Advertising offices at 310 East 45th Street, New York 17, N. Y. Subscription rates: U.S.A. and possessions, $5.00. Canada and South America, $6.00. All other countries, $7.00. Single copies 50¢ each, except special issues which are $1. Acceptance under Section 34.64 P. L. & R. Authorized.

Copyright 1954 by
PUBLIC WORKS JOURNAL CORP.
310 East 45th St., New York 17, N. Y.

PUBLIC WORKS MAGAZINE

CONTENTS

August, 1954 **Vol. 85, No. 8**

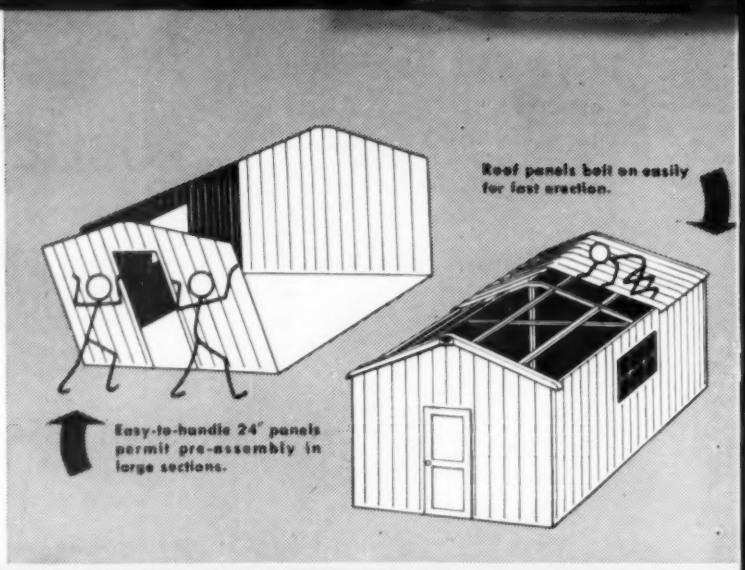
25 Years of Winter Maintenance in New Hampshire. *By LeRoy F. Johnson* 67
Getting Water and Sewerage Facilities Ready for Winter 70
Where Snow and Ice Control is a Big Problem. *By C. Leland Wood* 72
Power Digger Saves Money for City 75
We Use Winter to Repair Paving Equipment. *By Emil Halik* 76
The System That Cured Our Record Keeping Headaches. *By Willard S. Jeffries* 77
Getting Hydrants Ready for Winter 78
Public Works Financing: How to Show the Benefits of Storm Sewers and Responsibilities for Them. *By C. S. Seabrook* 79
Fluorescent Mercury Vapor Lights in New Orleans. *By Guy Browning Arthur* 81
Snow and Ice Control on the Edge of the Cold Belt. *By Wm. A. Xanten* 83
Equipment for Sewer Maintenance. *By Alvin A. Appel* 86
New Type Traffic Separating Bars. *By Mark McMillin* 89
Marking Meter Box Tile in Fiber Forms. *By Allen J. Brumbaugh* 90
Heating Provides Built-In Safety for Expressway Ramps. *By Leo F. De Marsh* 92
Flood Waters Pumped to Reinforce Reservoir Supplies. *By Guy Browning Arthur* 93
Chemical Weed Killers Improve Ditch Maintenance. *By Wm. D. Hogan* 95
Prefabricated Bridges Reduce Replacement Costs 96
Air Mapping Completed for Kent County, Mich. 98
English Research on Sewage and Industrial Waste Treatment 102
The City Traffic Muddle—What Exit? From a paper by *Harry Barnes* 107
A Test of Methods of Backfilling Trenches 126
How to Build a Concrete Sidewalk 131
Waterborne Disease Outbreaks Reported by the PHS 132
Intermediate Bituminous Mixes Help Stretch Funds 133

The Water Works Digest 112
The Sewerage and Refuse Digest 120
The Highway and Airport Digest 128

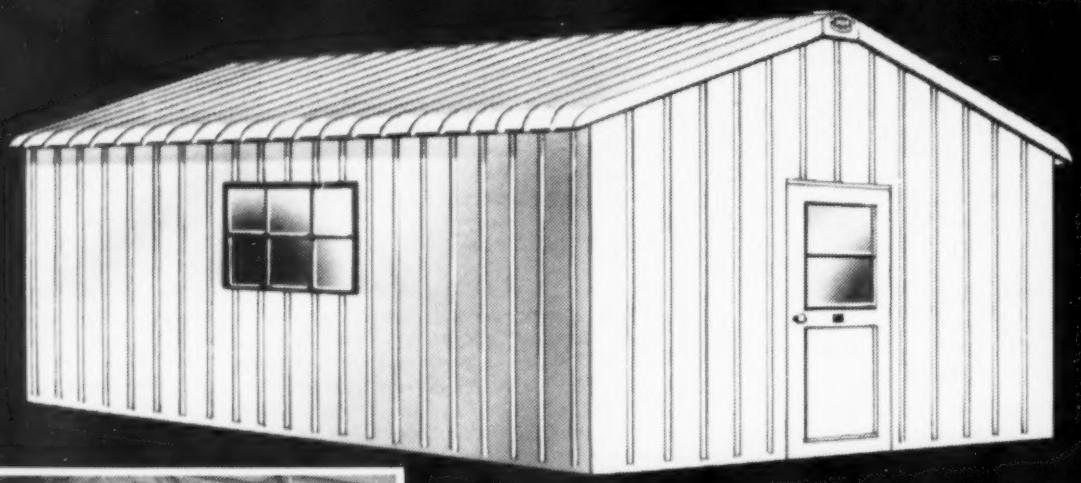
The Editor's Page 7
Leaders in Public Works 18
Letters to the Editor 26
Books in Brief 28
The Engineers' Library 32
Up Front for Adequate Roads. By *"Jack" Ritter* 52
Worth Telling. *By Arthur K. Akers* 146
People, Ideas & Events. *By "Doc" Symons* 58
APWA News 97
Washington News Letter 100
PW Engineering Data 110
New Public Works Equipment 138
Worth Seeing 145

THE MOST USEFUL ENGINEERING MAGAZINE FOR CITIES, COUNTIES AND STATES

NOW 2 men put it up with a wrench ...in hours



NEW BUTLER Panl-Frame Building



New steel framework with all-bolted construction gives you fast assembly, plus long life.

Here's a new steel utility building that's a budget planner's dream!

With Butler panelized construction, wall panels can be quickly and easily pre-assembled into large sections and tilted into place on any type foundation. A wrench and screw driver are the only tools needed. Unskilled workers can easily do the job.

Roof panels go up just as easily by simply bolting them to steel frame and eave channels. In hours, instead of days . . . and at minimum erection cost . . . a Butler Panl-Frame building is up and ready for use.

And the uses are unlimited—for field houses, bulk plants, supply depots, pump houses, electric power stations, garages . . . for every utility need. Sizes from 6′ to 24′ widths . . . 8′ or 10′ high sidewalls . . . in any lengths desired by adding extra sections.

In new Butler Panl-Frame buildings, you get built-in quality and construction features that have made Butler steel buildings best sellers the world over. Carefully engineered framework gives you maximum strength per pound of steel. Butler galvanized, high-rib panels add extra strength . . . provide permanent, weather-tight, fire-safe shelter.

Compare Butler Panl-Frame building prices and erection costs with those of conventional buildings. Learn how you can stretch your building budget. See your Butler dealer or write for free folder.

For prompt reply, address office nearest you:

BUTLER MANUFACTURING COMPANY,
7321 East 13th Street, Kansas City 26, Missouri
921A Sixth Avenue, S.E., Minneapolis 14, Minnesota
1021 Avenue W, Ensley, Birmingham 8, Alabama
Dept. 21A, Richmond, California

Please send me name of my nearest Butler dealer—also your free folder on new Butler Panl-Frame steel buildings.

Name_____

Firm_____

Address_____

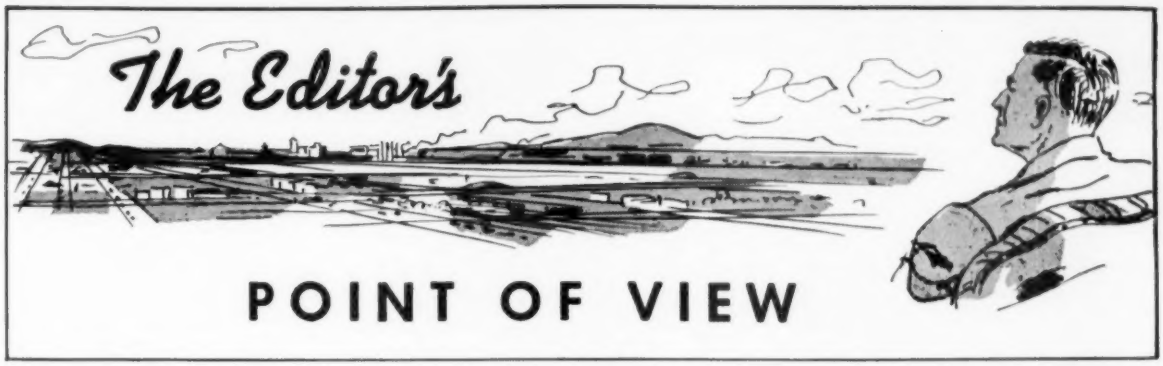
City_____ Zone____ State_____

BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY

Manufacturers of Oil Equipment • Steel Buildings • Farm Equipment Dry Cleaners Equipment • Special Products

Factories located at Kansas City, Mo. • Minneapolis, Minn. • Galesburg, Ill. Richmond, Calif. • Birmingham, Ala.



Controlling That Urge to Buy For Less

AS A MEANS for controlling the almost ineradicable urge that a few contractors have to "buy for less," some engineers are inserting a clause in the specifications which is a pretty good cure for this urge. This clause provides that, where the names of one or more pieces of equipment are given as a standard of quality, and the contractor desires to substitute a lower priced equipment, the difference in cost between the two items shall be rebated to the municipality. Of course, the substituted equipment also must be approved by the engineer.

Every engineer has had his difficulties with the contractor who shops around to get the very cheapest piece of equipment or the lowest cost kind of material that can squeeze into the specifications. Fortunately there are not many such contractors, but they do give a black eye to others in their field of work. The provision cited above, when properly and carefully used, can benefit both the municipality spending its money and the conscientious contractor who bids in good faith on a high-quality job.

Better Water Distribution—A Critical and Growing Need

IN most every community during these summer months, there is a shortage of water. In a great many cases the shortage is due to the inability of the water distribution system to meet consumer demands, which have grown steadily for many years. Even where the source of supply is inadequate, the distribution system is, in many cases, also inadequate, but this deficiency may be cloaked by the shortage of water.

We need a new and bolder approach to solve this water problem. Consideration should be given to a network of larger supply mains to reinforce the existing distribution system and make it capable of meeting to-day's needs for water usage. Elevated storage can be a potent factor, not only in mitigating immediate problems, but also in reaching a long-range solution.

The trend is toward a still greater use of water, and this cannot be stopped permanently merely by restrictive regulations. Our cities must take positive steps to provide an adequate flow of water throughout their communities in order to serve properly their citizens and to maintain safe fire-fighting facilities. Fortunately, the water works and construction industries are better equipped than ever to meet this pressing need: better pipe; better jointing materials; and cost-saving equipment for construction—all are available; and so are engineering skills. But it is essential for someone to conceive, initiate and carry out the necessary steps to meet this steadily increasing need for more water delivered to the consumer. Here is a challenge to engineers, not only to plan but also to make their plans into reality.

We know they can do it.

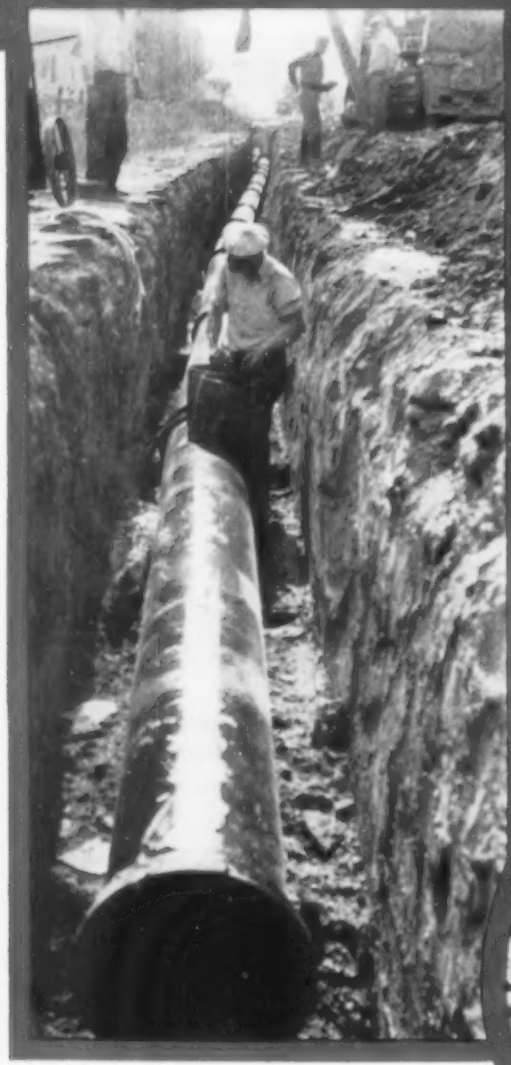
The Control of Hepatitis: Another Job for Engineers?

VIRAL hepatitis was an important military disease during World War II and probably has been in every war. There seem to be no reliable statistics on its civilian incidence, but it is probably considerable. There are two forms of this disease, one of which, the IH (or A) type, is transmitted by fecal contamination as well as by the blood. Most of the naturally acquired infections of the IH type appear to be spread by the intestinal-oral route, as by water or by food.

Military experience indicated strongly that food and water were important means of spread. Considerable work was carried out to determine methods of water treatment that would destroy the virus. It was found that, in water meeting normally acceptable standards of turbidity and clarity, a relatively moderate dosage of free chlorine was effective. In grossly contaminated water, heavy chlorine applications were required.

We believe that every reported outbreak of viral hepatitis should be investigated to determine the methods of spread. Though this may be difficult at times, due to the long period sometimes required for the development of the disease, such investigations will build up the needed reservoir of data regarding the part that water has in the transmission of this disease; and also in the steps necessary for its control.

For TOUGH assignments



When pipe is to be installed under conditions which make repairs difficult at best, the engineering profession relies on cast iron pipe. Such installations, for example, as outfall sewers, river crossings, and sealed piping in sewage treatment and water filtration plants. *Any* installation, where repairs should be a remote possibility, calls for rugged cast iron pipe. Its great beam-strength, compressive-strength and shock-strength—plus its effective resistance to corrosion—result in long life with negligible repairs and maintenance cost. For information write: Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, 122 So. Michigan Avenue, Chicago 3, Ill.

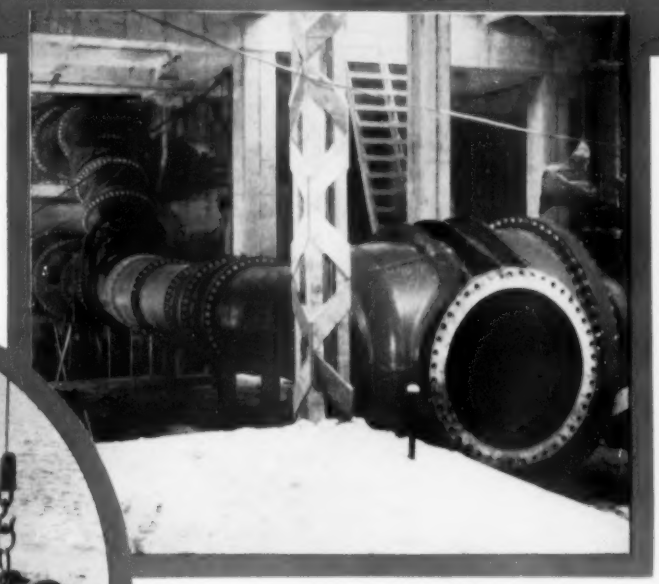
(above)
Installing cast iron belt feeder main for water supply system in Casper, Wyoming.

(right)
Cast iron pipe for discharge lines from water circulating pump house in a midwest oil refinery.

CAST IRON PIPE

Now's the time to mail this month's Readers' Service card.

use this RUGGED pipe



(above)
Cast iron pipe for outfall into St. Joseph Sound from sewage disposal plant at Dunedin, Fla.

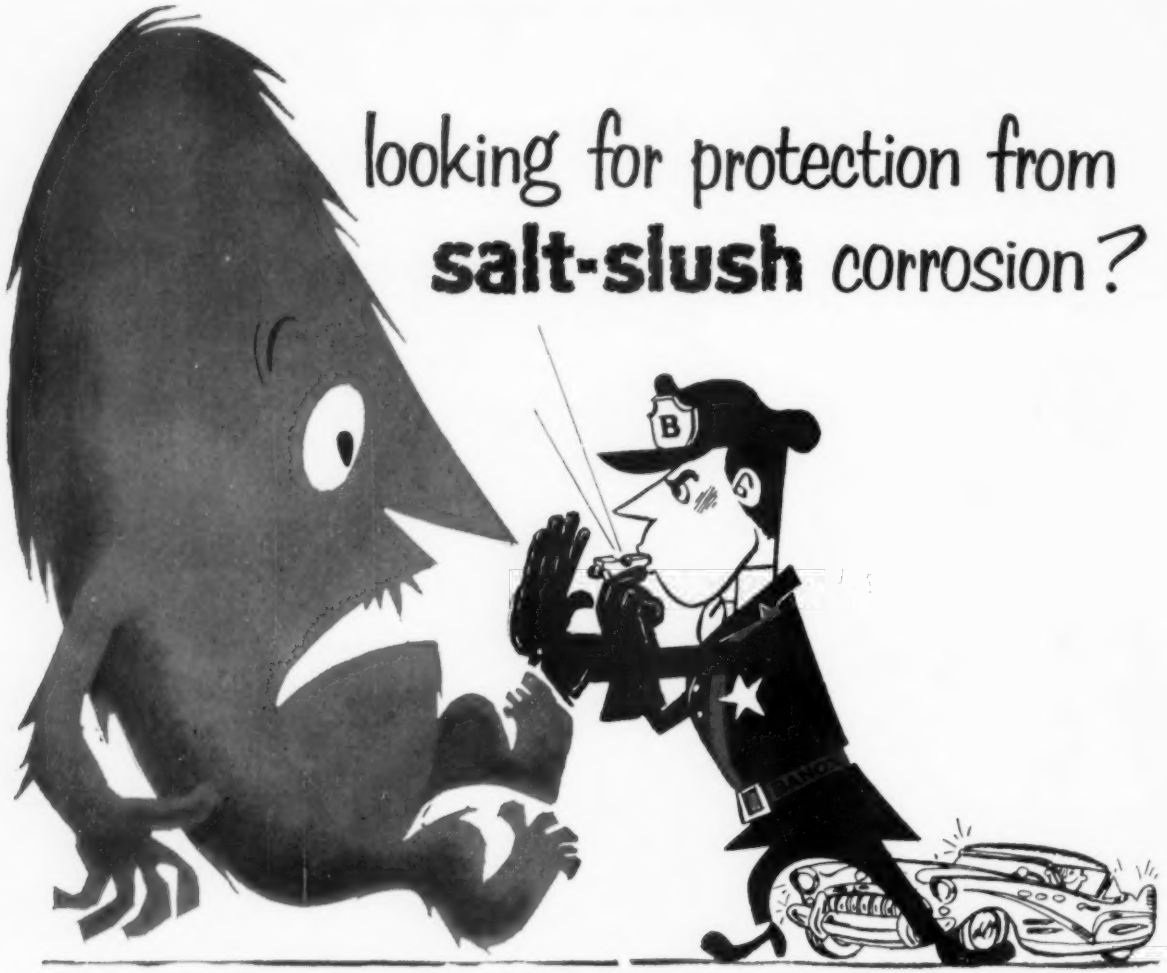
(top right)
Cast iron pipe and fittings installed in world's largest water filtration plant in Chicago, Ill.

(at right)
Installing 30" cast iron pipe for sewage treatment plant at Panama City, Fla.

SERVES FOR CENTURIES...

It's a fact... our handy Readers' Service card is the way to get new catalogs.

looking for protection from **salt-slush** corrosion?



use BANOX®

Everyone knows that salt is better and thriftier* than abrasives for keeping streets and highways clean and safe for winter driving. But salt does have one important drawback: Salt-Slush Corrosion. Here's where Banox can help.

Banox will give you the clean-street benefits of salt without the penalty of salt-slush corrosion and Banox does it for very little additional cost. As little as 1% of Banox, easily added to salt, will stop salt-slush corrosion on automobiles, municipal equipment, bridges and other metal surfaces. Furthermore, a salt-Banox mixture does not clog gutters, catch basins or sewers, thereby eliminating costly clean up in the spring.

Remember, if you want the best, and lowest cost snow and ice control, just use one pound of Banox for every hundred pounds of salt. Investigate the benefits of the Banox-salt team. Write for your free booklet: "*Stop, Look and Save with Banox.*"

*Comparative cost figures for both city streets and highways indicate that you save as much as $4.27 per mile by using rock salt instead of abrasives.

BANOX

calgon inc.

HAGAN BUILDING, PITTSBURGH 30, PENNA.

Master Plumber–

You're Right

–Day or Night–

When you Specify

WOLVERINE!

Copper water tube

S.P.S. pipe

Electric-welded steel tube–

for low pressure, non-corrosive applications in closed systems

Order it by Name

...and BUY FROM YOUR WHOLESALER

WOLVERINE TUBE

DIVISION OF CALUMET & HECLA, INC.

Manufacturers of Quality-Controlled Tubing

1427 CENTRAL AVE. • DETROIT 9, MICH.

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES.

EXPORT DEPT. 11 E. 40TH ST., NEW YORK 16, N. Y.

Aerial view of the Kansas City, Kansas, Works, Fairbanks, Morse & Co., 3601 Kansas Avenue.

...from Kansas City

Yes, from our new, modern-as-tomorrow works at Kansas City, we serve the world's needs for pumps.

As a major supplier of quality pumping equipment, it is particularly suitable that this new Fairbanks-Morse plant be located at an important crossroads of the world . . . Kansas City. In this new plant 190,000 square feet of manufacturing space and a complete foundry occupying 150,000 square feet are devoted to bringing better service to our customers all over the world.

Modern manufacturing, development and testing equipment backed by engineering and production skills of highly trained personnel combine to produce products of unmatched quality . . . in performance, durability, economy. Fairbanks, Morse & Co., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the best

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Thousands use our Readers' Service card to keep up to date . . . do you?

There's a lot you can't see...

when you look at a PAYLOADER® tractor-shovel.

YOU CAN'T SEE the 34 years of pioneering experience in building hydraulic tractor-shovels — MORE experience than all others combined!

YOU CAN'T SEE the millions of dollars of parts and service facilities which more than 300 "PAYLOADER" Distributors maintain for their customers' convenience.

YOU CAN'T SEE that 90% of all the "PAYLOADER" tractor-shovels built in the last fifteen years are still in service!

YOU CAN'T SEE the more than 22,000 "PAYLOADER" units throughout the world — more than all others combined!

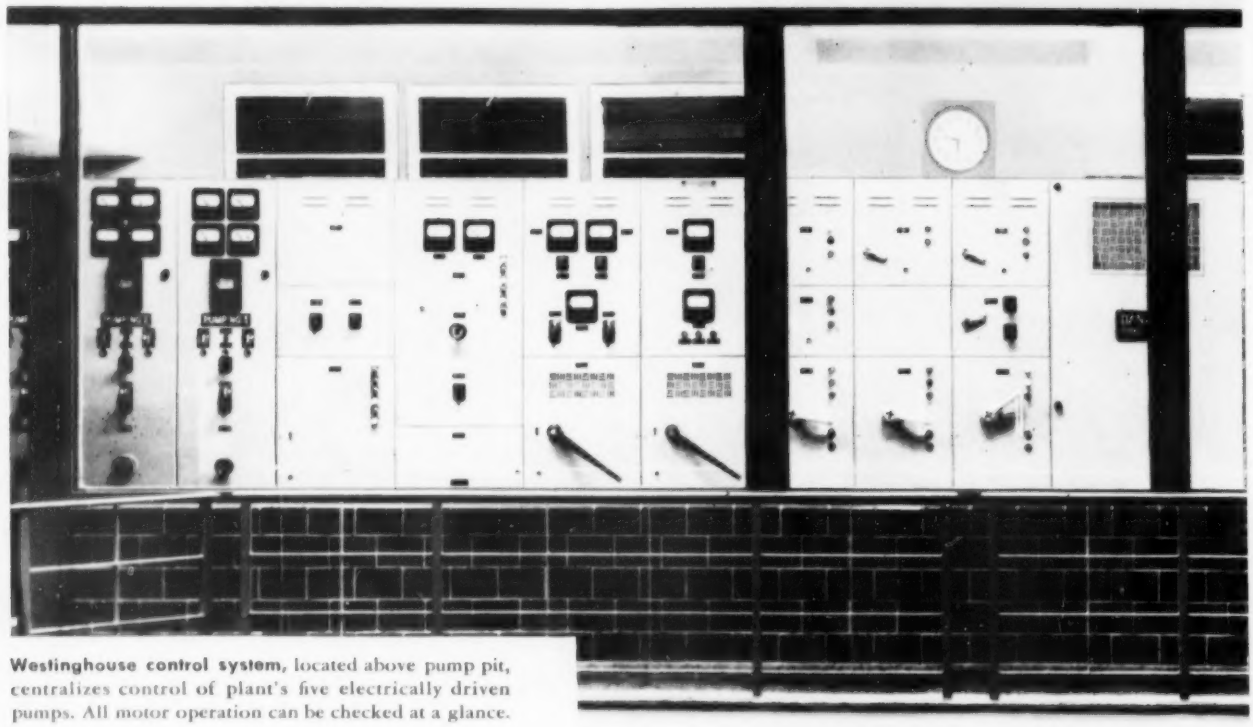
YOU CAN'T SEE the quality of hidden parts which are built more carefully, to more rigid specifications and with more "know-how" than any other.

The Overwhelming Preference for "PAYLOADER" tractor-shovels is the result of *proven* performance and customer *satisfaction.* Ask any owner or operator.

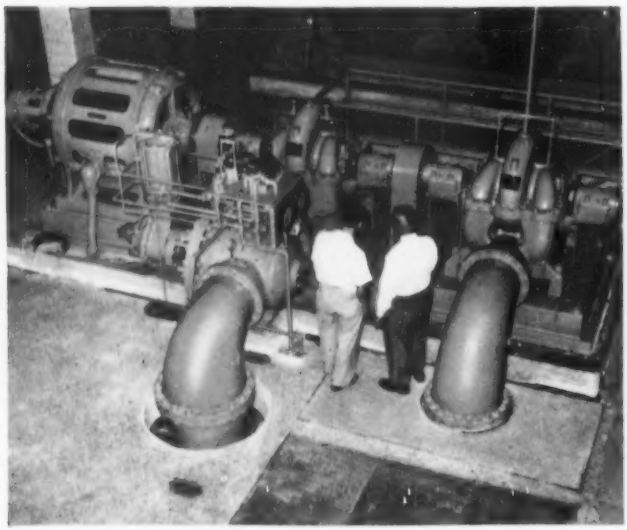
For complete information contact your "PAYLOADER" Distributor or write to The Frank G. Hough Co., 761 Sunnyside Ave., Libertyville, Illinois.

PAYLOADER®
THE FRANK G. HOUGH CO. · LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Now's the time to mail this month's Readers' Service card.



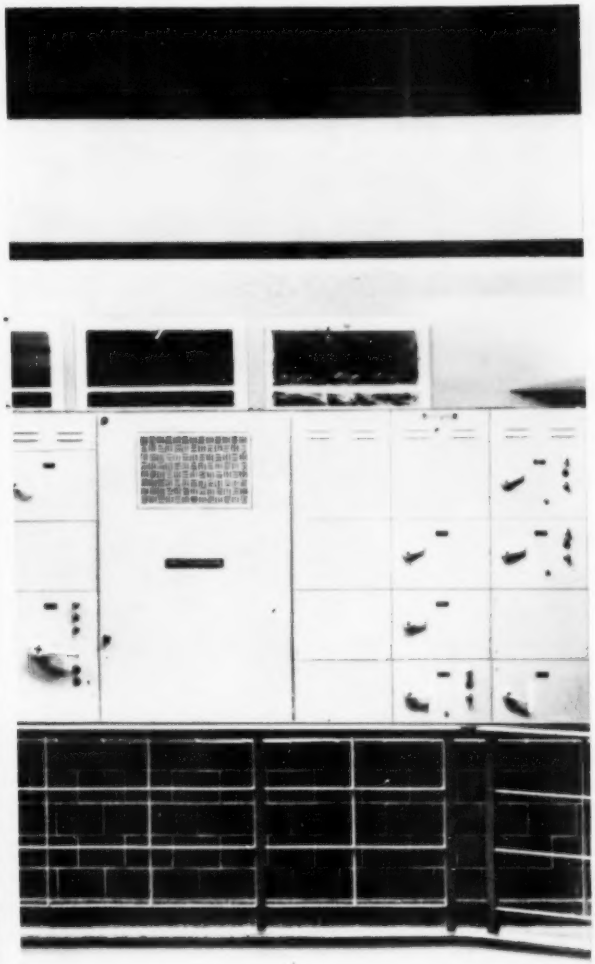
Westinghouse control system, located above pump pit, centralizes control of plant's five electrically driven pumps. All motor operation can be checked at a glance.

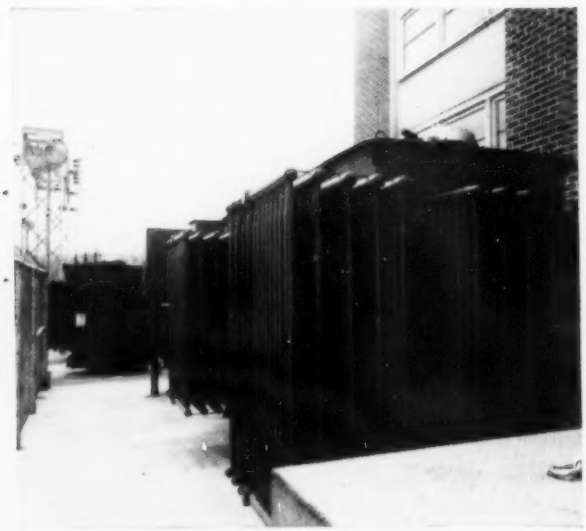


Westinghouse synchronous motor (2400 volts, 900 horsepower) operates one of the three 15-mgd electrically driven pumps at the three-million-dollar plant.

New 20-mgd filtration plant, Allentown, Pa. Consulting Engrs., Morris Knowles, Inc.; Electrical Contractor, Dravo Company—both of Pittsburgh, Pennsylvania.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.





Westinghouse power transformers (12,000 to 2400 volts) furnish the filtration plant's entire power supply. Left background: part of Westinghouse outdoor substation.

Allentown's outstanding filter plant has a centralized pump control system

The new 20-mgd filtration plant at Allentown, Pa., has stimulated considerable interest throughout the waterworks field. This outstanding installation doubles the available water supply and is expected to meet the city's needs for the next 30 years.

From planning stages through installation of equipment, Westinghouse teams worked closely with the consulting engineers. They helped design the electrical system. They matched it with coordinated products that met the plant's rigid requirements for attractiveness, efficiency and simplified maintenance.

How well these were carried out is reflected in the Westinghouse pump control system. Its many switching and control units blend in height and appearance due to their modular construction. Efficiency is assured since the system centralized in one location operation of the plant's pumps. And maintenance is simplified. By being mounted in one line, all units are easily accessible from the front of the board.

This is another example of Westinghouse engineering and product services—ranging from electrical system planning help through design and application of equipment to meet any power problem . . . in any industry.

One call to your nearby Westinghouse Office brings this complete service to you, your engineers and contractors. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa. J-94021

YOU CAN BE SURE... IF IT'S

Westinghouse

Get full details of this month's products . . . mail your Readers' Service card today.

One-Machine Street Department — The versatile Model D with ¾-yd. rear-end loader rough grades, spreads gravel, cleans up, loads trucks . . . gives many communities a one-man, one-machine street department.

Five Years in the Field Prove Big-Grader Performance . . . at One-Third the Cost

From its introduction in 1949, the Allis-Chalmers Model D established itself as a real pacemaker in the motor grader field. It was the first low-cost machine to offer such big-grader design and performance advantages as tandem drive, single member tubular frame and the famous ROLL-AWAY moldboard. To its thousands of satisfied owners, the Model D has proved again and again that it does outstanding work on both construction and maintenance.

The usefulness of this amazing machine goes far beyond basic blade functions, with several easily mounted attachments that make it invaluable all year 'round: hydraulically controlled, rear-end loader; shoulder maintainer that is interchangeable with loader bucket; "midship-mounted," hydraulically controlled scarifier; both blade and V-type snowplows.

To help cost-conscious communities, Allis-Chalmers has added even more to the Model D's workability. It now offers a new 50 brake horsepower, "POWER-CRATER" engine; leaning front wheels* and power circle turn*. Yet the Model D's original cost is still only one-third that of a large grader, and operating, service and replacement part costs are proportionately low.

We invite you to talk with your nearby Allis-Chalmers dealer . . . compare values . . . and then ask for a demonstration. Only by watching the Model D at work can you believe that a grader costing so little will do so much . . . *for you.*

*Optional Equipment

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

ROLL-AWAY and POWER-CRATER are Allis-Chalmers trademarks.

Need more facts about advertised products? Mail your Readers' Service card now.

Cuts Equipment Investment — Low original cost, low operating cost make the Model D today's biggest motor grader value. Compact and maneuverable, the "D" is a natural for close-quarter work.

Keeps Shoulders Safe — Model D shapes shoulder, blading windrow next to edge of pavement where rear wheels compact gravel . rear-mounted blade feathers out windrow . . . to keep shoulder safe and well-drained, *all in one pass.*

More Maintenance per Tax Dollar — You can have three Model D's for what one large motor grader would cost . . . maintain three times as many miles of road . . . keep your roads in good condition *all* the time.

LETTERS from communities —

Sirs:

We have been entirely satisfied with the Model D. It has proved to be a year 'round piece of equipment. We use it in the summer for grading and ditching and in the winter for plowing and it does both jobs well. Maintenance has been very moderate and your service excellent.

L. W. O'Connor
Town Manager
Bucksport, Maine

Sirs:

I have operated heavy equipment of all kinds, makes and models for 22 years. I find that with this machine (the Model D) there is no job too large or too small. I clean streets, take dirt off streets, cut a 32-inch ditch for gas, water and sewer lines and backfill, break out asphalt, work base, spread asphalt, maintain all city streets, and build streets for new suburbs. With the rear-end loader I use it for laying 6-inch water lines, clean out sod on city streets, load base material, use it as a dozer blade, and dig and clean out drain ditches at sewer plant.

This machine has finger-tip control and very good visibility . . . it is very easy to do precision work. I highly recommend this machine for high performance and very low maintenance.

Curtis M. Sollock
Superintendent of Streets, Water Works,
Gas & Sewage of the City of Devine, Texas

Sirs:

I have used our D Motor Grader two years. In that length of time I have found it to be very economical and efficient. We never use over a gallon of gasoline per hour on our hardest work. We have built several blocks of streets, sloped banks, cut ditches, and scarified black-top streets and reshaped them. We are going to reshape and refinish about twelve blocks of streets this year. We will use the D for scarifying and oil mixing. In fact, we don't expect to use any other machine on this job.

This machine is an operator's dream. We use our D and TLD Loader for snow removal. The city is very pleased with this machine's performance and economy. I, as the superintendent of streets, think it can't be beat.

George D. French
Superintendent of Streets
City of Lamoni, Iowa

Sirs:

Just a few lines to let you know some facts about the two Model D's Pike County purchased a few years ago. They enabled us to divide our mileage in such a way that each machine could make its route once a week instead of once every two weeks as had been the case in the past. The two Model D's were given a route of 30 miles each which they make in 4½ days. As a result we were able to maintain every road we have in the County once a week, therefore, all roads are kept in better condition.

I am firmly convinced that Pike County has profited by the purchase of these machines as the roads are in better condition due mainly to regular routine maintenance.

Dallas Strubinger
County Superintendent of Highways
Pike County, Pittsfield, Illinois

Sirs:

We find our Model D very economical considering the work it performs. Especially like the ROLL-AWAY moldboard and operating ease. Have done a lot of grading, ditching, and snow removal, and find it very satisfactory for a town our size.

Clyde Wood
Road Supervisor
Chester R. Johnson
Water Supervisor
Holden, Utah

Thousands use our **Readers' Service** card to keep up to date . . . do you?

BLAW-KNOX BASE PAVERS

MODEL P-150 LAYS BASE PAVEMENT UP TO 400 TONS PER HOUR

● Base course paving is fast, accurate and economical with this high tonnage producer. You can spread stone, slag, gravel, soil cement or crusher run aggregates to depths up to 20″ and widths up to 16′ in one pass, with no separation of material. There's plenty of traction and power to push your trucks, yet flotation for the softest surfaces. Oscillating action of the V-type screed "knits" material into the voids for accurately level and smooth base courses. Operating costs are low. Hand dressing behind the unit is reduced to the minimum. Blaw-Knox Apsco Base Pavers are available in two models to meet every base pavement requirement. Write for complete details in Bulletins 2457 and 2459.

BLAW-KNOX APSCO ROAD WIDENERS

These heavy-duty time and labor saving units handle concrete *without forms*, asphaltic concrete and any kind of aggregate. They spread and finish concrete up to 1½ miles per day . . . build earth shoulders at the rate of 200 tons per hour. Two sizes available to meet your needs. Send for Bulletin 2458.

Ask your BLAW-KNOX DISTRIBUTOR about the *"Complete Packages"* of Concrete Paving and Ready-Mixed Concrete Equipment

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
PITTSBURGH 38, PENNSYLVANIA
Offices in Principal Cities

BLAW-KNOX

Now's the time to mail this month's Readers' Service card.

LEADERS IN PUBLIC WORKS

C. W. Hamblin has been with the City of Mason City since 1945. Initially he was Building Commissioner; then successively Water Superintendent, City Engineer, and Superintendent of Public Works. His present position covers the following departments: Engineering, Water, Sewage Disposal, Sewer, Garbage, Street, Alleys and Parks. He has had wide engineering experience, with the Soil Conservation Service; with the Corps of Engineers; on aerial mapping; and on defense plant construction, receiving an award for his part in atomic bomb plant construction.

Mr. Hamblin has been responsible for the following accomplishments in Mason City: The construction of four parking lots to accommodate 370 cars; paving of 165 blocks; widening of 66 blocks; resurfacing of 336 blocks; sanitary, storm sewer and water main installations; oiling 140 blocks; and installing modern street name signs and traffic signs throughout the city; also for the modernization of the garbage collection and disposal system (Mason City was the first town in Iowa to inaugurate a sanitary fill). Street Department equipment has been completely modernized, with the purchase of equipment amounting to $108,000; and the street lighting system also modernized.

He graduated from Iowa State College in 1934, with a BS degree in Civil Engineering. He is a member of APWA; Iowa Section of AWWA (past chairman); FSIWA; Iowa Engineering Society; and North Iowa Technical Association. He is active in local community affairs also.

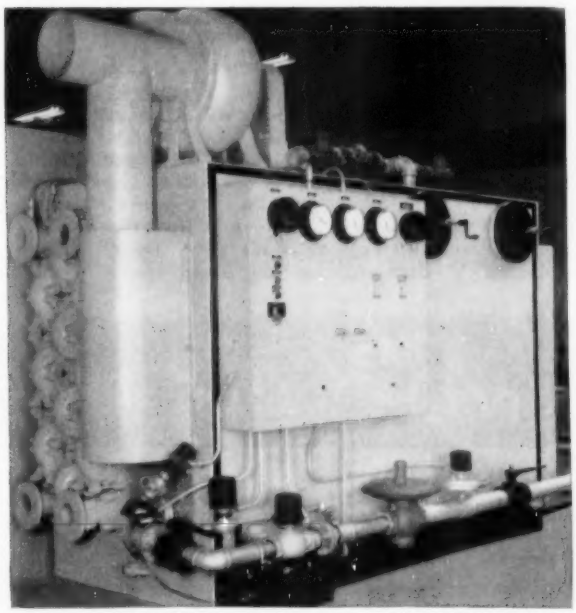
At Tacoma, Washington . . .

This Gleaming New Plant is Run at Peak Efficiency

WITH MODERN PFT EQUIPMENT

Sparkling clean and beautifully landscaped, Tacoma's new primary sewage treatment plant is a model of modern treatment methods and efficient operation. Completed in 1952, it uses PFT equipment for *effective treatment* and *more convenient operation*.

For the digestion tank, a *PFT 75' Floating Cover* was installed for positive scum submergence and more flexible capacity (the cover simply rises or lowers with additions and withdrawals). The snug fitting cover eliminates odor and fly nuisance, and explosion hazards are reduced because gas collected under the cover is maintained at positive pressure under all operating conditions.



PFT #1000 Digester Heater and Heat Exchanger

For added convenience, a *PFT Cover Position Indicator* in the Control Building tells the operator at a glance the position of the cover.

A *PFT Heater and Heat Exchanger* unit automatically provides building heat and maintains close temperature control of the digester. Fired by gas *or* oil, it cuts fuel costs substantially by utilizing all gas produced in the digester. Tacoma's efficient digester operation is largely due to this close, automatic heat control!

Other PFT equipment in the new plant includes the following Gas Safety equipment—Heater Flame Trap; Pressure Relief Waste Gas Flame Trap; Waste Gas Burner; Pilot Line Flame Cell; Drip Traps.

The Tacoma plant's success results from close cooperation among three key men—C. S. Seabrook, Sanitary Engineer; Louis E. Fox, City Engineering Department; and Lyman Ketcham, Chief Operator.

Design / Engineering Office of plant by / of Clyde C. Kennedy

P.F.T.

waste treatment equipment exclusively since 1893

PACIFIC FLUSH TANK CO.

4241 Ravenswood Avenue
Chicago 13, Illinois

NEW YORK • LOS ANGELES • SAN FRANCISCO • CHARLOTTE, N. C. • JACKSONVILLE • DENVER

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

GALION ROLL-O-MATIC TANDEM ROLLERS

Give you a NEW meaning in POWER-

EFFECTIVE DRIVING POWER

The **ROLL-O-MATIC** *is simple to operate.*

There is no master clutch lever, gear shift lever, or throttle to bother with — all these operations are now done AUTOMATICALLY . . . To reverse the direction of travel, the operator simply engages the reverse clutch by easy movement of a convenient lever. The transition from forward to reverse travel is fast but smooth as velvet . . . Engine braking power on downhill grades is smooth, effective and dependable.

The most economical to operate.

Roller maintenance and operating costs take a nose dive when you standardize on Galion ROLL-O-MATIC Tandems. You can save up to 25% in fuel alone . . . you get up to 35% longer engine life . . . forward and reverse clutches last 40 to 50% longer . . . gears, shafts and bearings show very little wear . . . you can roll at least 10% more surface per day — under any conditions.

You get GALION TANDEMS with ROLL-O-MATIC DRIVE . . .

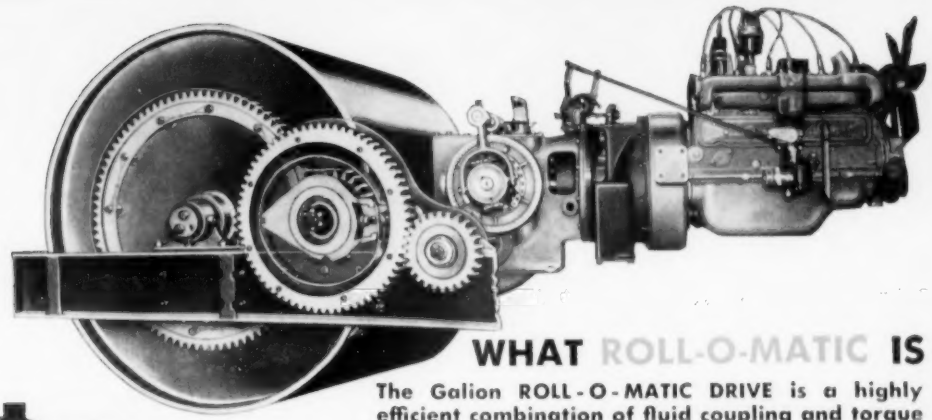
AUTOMATICALLY *maintains rolling speed. Engine power is automatically increased or reduced as needed.*

FOR EXAMPLE

If you move the control lever to a rolling speed of 2 m.p.h., the roller will closely maintain this speed automatically, whether it is working up hill, on the level, down hill, or on curves.

MASTER CLUTCH AND GEAR SHIFT ARE ELIMINATED

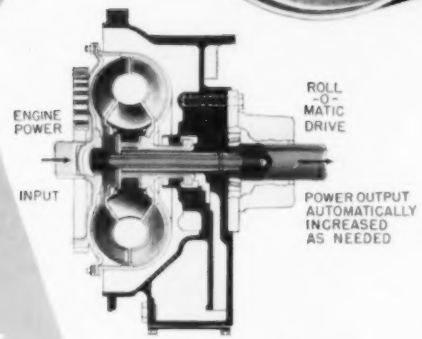
Power is applied automatically in exact proportion to the need.



WHAT ROLL-O-MATIC IS

The Galion ROLL-O-MATIC DRIVE is a highly efficient combination of fluid coupling and torque converter. *It automatically and smoothly multiplies the engine driving force* by means of oil in motion instead of by transmission gears. ROLL-O-MATIC DRIVE *must not be confused with fluid couplings or fluid drives.* All fluid couplings or fluid drives operate only as fluid clutches. They cannot increase engine torque on the drive shaft, only transmit it.

GALION ROLL-O-MATIC DRIVE serves not only as a fluid clutch, but also multiplies the driving force by means of a torque converter* — thus serving in addition as an automatic fluid transmission. *General Motors-Allison Torque Converter

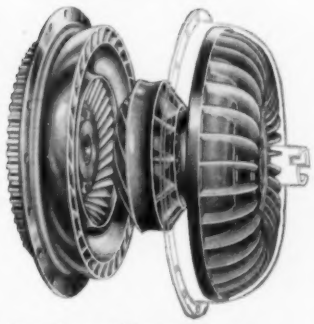


UP TO 25% SAVING IN FUEL

More than TWICE the needed power is available.

35% MORE ENGINE LIFE

Gears, shafts, and bearings wear longer.



WHAT ROLL-O-MATIC DOES

- It saves you money through an amazing reduction of fuel, mechanical wear, and maintenance.
- It sets a new standard of job performance and quality.
- It provides the most efficient application of power.
- It simplifies tandem roller operation.
- It eliminates shock loads. No engine stalling or overloading.
- It assures smoothest reversing action.

Sets a new Standard of performance.

By actual tests, you can roll at least 10% more surface per day under any conditions. This is possible because of the wide range of working speeds available — and faster, smoother reversing at the end of each pass.

Rolling speeds from .8 m.p.h. to 5.5 m.p.h. are possible. ROLL-O-MATIC DRIVE provides an infinite number of driving ratios (WITHOUT gears).

Operators can devote more attention to efficient maneuvering and precise rolling — more and better work with less physical effort.

OTHER GALION TANDEM FEATURES

- Straight line spur gear final drive.
- Final drive gears located on left side of roller for close-to-curb work.
- Dual controls and movable operator's seat permit efficient operation of roller from either side of operator's platform.
- Hydraulic steering.
- Metal shield prevents dust, dirt, etc. from entering radiator.
- Three hinged grilles for complete ventilation of engine compartment and housing.
- Streamlining provides best visibility for the operator.

..at NO INCREASE IN FACTORY LIST PRICE!

A complete range of sizes

ROLL-O-MATIC DRIVE is supplied on 5-8, 8-10½, 8-12 and 10-14 Ton Tandem Rollers with gasoline engine--conventional "gear shift" models are also available with gasoline or diesel engines.

ESTABLISHED GALION 1907

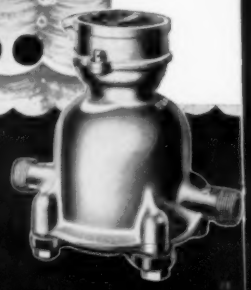
The World's Largest Manufacturer of Road Rollers

THE GALION IRON WORKS & MFG. COMPANY

General and Export Offices, GALION, OHIO, U.S.A. Cable address: GALIONIRON, Galion, Ohio

Water is vital...

BADGER meters conserve it BETTER!



THE cropless wastes of once-fertile land have proved it again . . . water makes the difference between food and famine! Today, thousands of farmers and ranchers must haul water from nearby towns. With water supplies so low, Badger meters are almost as vital as the water itself. They provide a precise check on usage and waste . . . assure a fair allotment of the water available . . . and help water departments get a fair price for water and service. As a result, Badger meters even help keep waterworks self-supporting for thousands of communities. And they operate dependably, economically, with a minimum of servicing.

BADGER Water Meters

BADGER METER MFG. CO.
Milwaukee 10, Wisconsin

"Measures the water of the world"

"Scotchman" SALTING = SAFETY

The *"Scotchman" Method* of spreading de-icing salts gives you *Protection* and *Safety* 8 *times FASTER* and 50% *CHEAPER*. You get *Positive Protection* against Ice and Snow hazards without the use of sand or cinders.

TARCO "Scotchman" salt spreader in action and in detail.

The "Scotchman-Way" of winter-time salting is most popular because the "Scotchman's" thin, even "bird-shot" melting pattern produces *FASTER* positive *Results* with *Less Salt*. Your "Scotchman-Way" is the Saving Way—*saving more time; saving more material.*

Your "Scotchman" will give you instant and accurate *control* of *WIDTH of SPREAD* from 4 to 30 feet wide; *DIRECTION OF SPREAD* all left, all right, or all to the rear; *RATE OF APPLICATION* from 150 lbs. per mile up to 2500 lbs. per mile. Your stainless steel, weather-protected "Scotchman" will handle your chemicals bagged or in bulk (without shoveling) from any truck or pick up.

DON'T WAIT — 'TILL IT'S LATE; INVESTIGATE ! !

SEND FOR FREE LITERATURE TO-DAY

SEE BOOTH A-15 A.P.W.A. CONGRESS ATLANTIC CITY SEPT. 19-22

TARRANT MANUFACTURING CO.

27 Jumel St., Saratoga Springs, N. Y.

Now's the time to mail this month's Readers' Service card.

Ends Rats at

A QUICK CHANGE FOR THE BETTER is provided by the INTERNATIONAL TD-14A crawler tractor and Drott Bullclam shown working on the Taylor Kent Sanitary Landfill site in Robertson, Missouri. In the first picture, the TD-14A and Bullclam cut deep to put out fires and cover rat-breeding refuse. The second picture, made only a few days later shows the same area leveled and cleared with the INTERNATIONAL-DROTT unit ready to spread a clean earth cover over part of the more than 750 cubic yards of refuse dumped daily at the fillsite.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

Robertson

Sanitary Landfill Method of Garbage Disposal Being Used in St. Louis County, Missouri, to Convert Community Eyesore to Public Playground.

The roar of the powerful INTERNATIONAL TD-14A crawler and DROTT BULLCLAM shovel working on a sanitary landfill site in Robertson, Missouri, will soon be replaced by the laughter of children at play.

For today, the ramp method of Sanitary Landfill is being used to build a 32-acre playground on what was once a rat-infested, highly odorous open dump.

Thousands of dollars in sprays and uncounted man hours had been spent in futile attempts to control the rats and the flies and eliminate the odor that threatened the health of the citizens in the community.

Two days after the INTERNATIONAL-DROTT ramp Sanitary Landfill operations were started, rat infestation ended. It was also the end of the flies, the odors and the wind-blown waste that had plagued the area for years.

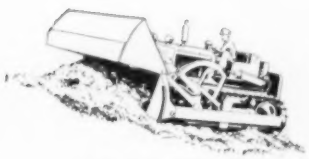
In a few short years, fill operations will be complete. Then the site will be seeded, playground equipment installed, and turned over to the city of Robertson as a gift in memory of her husband by public-spirited Mrs. Taylor Kent, present owner of the tract.

All refuse collected in St. Louis County is now disposed of by the Sanitary Landfill Method.

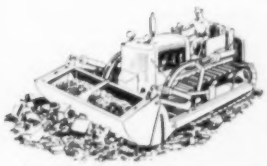
And all the equipment used on the major Sanitary Landfill sites in St. Louis County is International-Drott.

INTERNATIONAL-DROTT is the only equipment specifically designed for methods of Sanitary Landfill. Call your INTERNATIONAL-DROTT distributor today. See for yourself how this "one-man sanitation squad" can put a fast, economical end to refuse disposal problems.

DROTT MANUFACTURING COMPANY, MILWAUKEE 8, WISCONSIN
INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS



1. Prepares the Site



2. Crushes and compacts refuse

3. Transports and spreads earth cover

4. Grades and levels finished area.

BULLCLAM BY DROTT

POWER BY INTERNATIONAL POWER THAT PAYS

INTERNATIONAL HARVESTER

Get full details of this month's products . . . mail your Readers' Service card today.

*To Reduce Maintenance and lower Operating Costs.....

SEWAGE TREATMENT PLANTS
ARE *Specifying.....*
HOMESTEAD
Self-Seald...Lubricated
PLUG VALVES

THEY GIVE LONGER SERVICE BECAUSE THEY
automatically adjust for wear!

HOMESTEAD Self-Seald LUBRICATED PLUG VALVES provide lower-cost-per-year fluid control than any other valves within their service range. Extra long, leakless service, less maintenance and lower operating costs are assured by the exclusive, *self-sealing*, wedge-acting, two piece plug that *automatically adjusts* to make up for wear as wear occurs, thus keeping the seating surfaces of the plug and valve body in constant contact to maintain a perfect, drop-tight seal. Add to this the extra advantage of a full lubricant seal around the ports and the top and bottom of the valve, and you have the reasons why HOMESTEADS' are noted for lower replacement and maintenance costs. Specify "HOMESTEADS" on your next valve job, or slip them in on your next replacement.

We can furnish them in semi-steel or cast-steel, 100% Port Area or Venturi, in sizes ½" to 14", for steam working pressures to 150 lbs., or air—water—gas to 200 lbs. ***Also available in one piece plug design.***

Some "Self-Seald" Features

- Combines positive seating of tapered plug with operating ease of cylindrical plug.
- Leakproof triple head seal.
- Port area equal to 100% std. pipe area.
- All sealing surfaces protected from line fluids.
- Full threaded lubricant screw.
- Quarter turn opens or closes.
- Port position indicator.

MAIL COUPON TODAY for VALVE REFERENCE BOOK No. 39-5
For local distributor see Yellow Pages of your Telephone Book.

Please send me VALVE REFERENCE BOOK No. 39-5 and price list of Homestead Self-Seald Lubricated Plug Valves.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

HOMESTEAD VALVE MANUFACTURING COMPANY
Serving Since 1892

P. O. BOX 40 CORAOPOLIS, PA.

Need more facts about advertised products? Mail your Readers' Service card now.

TRASH LOADER EXPERIMENTATION

We are just completing a $235,000 hot mix resurfacing program. The average cost will run about 75¢ per sq. yd., or $7.10 per ton complete with inspection, engineering, etc. Now we are interconnecting 7 traffic signals which have been installed recently. One thing which may be of interest to you is a new type of trash loader which we shall have in operation soon. With a 12-month growing season, trash collection is a relatively expensive undertaking for Florida cities. If the experiment proves successful, I shall be happy to pass the information on to you for the benefit of many city engineers and Public Works officials who are, I imagine, interested readers like myself. Yours is certainly an interesting and helpful publication, especially to us in the public works field.

Max Sturm
City Engineer & Dir. Public Works, Sarasota, Florida.

PORT AND SHIP WATER SUPPLY

The statement made in your editorial in the May issue on port and ship water supply is of historic reference only, so far as shipboard water supply is concerned. There is a simple and economical answer to this problem and that is evaporation. It is our understanding that practically every seagoing vessel now being built has evaporation equipment for the production of pure water from the sea. Our Company has been installing evaporators in ports and on islands since long before World War II. We have installations at Gibraltar, Bermuda, Dharan, Port Etienne, Santa Rosa Island, Hawaiian Islands, Phoenix Islands, Marshall Islands, Gilbert

THE LATEST DEVELOPMENTS IN HIGHWAY AND AIRPORT FORMS

● All paving forms should perform two distinct functions. First, they should accurately confine the limits of the pour, and, secondly, they must act as track, supporting and steering the massive machinery required to prepare the subgrade, spread, finish and cure the slab.

● The ability of Heltzel Forms to best fulfill these two basic functions is the big reason why they are preferred by leading contractors everywhere. For behind the Heltzel name is almost half-a-century leadership in the design and manufacture of steel forms. This "know-how"—has enabled Heltzel to constantly produce practical, workable, "form setter's" forms that set fast, align perfectly, hold steady and firm. And "Heltzel Built" means they're precision fabricated of special analysis carbon-manganese steel, pre-stressed to withstand heaviest loads without failure.

● The form illustrated above is the latest design of the popular HELTZEL DUAL-DUTY FORM. (Two forms in one for two different slab thicknesses.) It features extra-wide, two-way stake pockets and restyled end supports which add up to the strongest form in the field. The triple-prong slide locking arrangement and single direction wedging gives form setters perfect alignment with a minimum of effort.

● This long experience and constant experimentation make it just common sense to see the Heltzel representative in your area before you purchase form equipment. If you don't already have a complete file of Heltzel Form literature, use the coupon below.

HELTZEL STEEL FORMS

Please send latest form literature to:

Name_____

Company_____

City_____ State_____

THE HELTZEL STEEL FORM AND IRON COMPANY • 8200 THOMAS ROAD • WARREN, OHIO

Need more facts about advertised products? Mail your Readers' Service card now.

For Trouble-Free Pipe Threading ...its a 65R RIDGID

Every "65R" TESTED for Perfect Threads before shipment

This 65R threads 1" to 2" pipe with 1 set of dies ...and it won't jam!

You won't find a die stock to equal this popular 65R—anywhere! It saves time—one set of self-contained high-speed dies adjust to 1", 1¼", 1½" or 2" pipe or conduit in 10 seconds! Mistake-proof self-centering workholder sets to size instantly! It saves trouble—lead screw won't jam, it kicks out automatically when standard length thread is cut. Clean perfect threads, *fast!* For trouble-free extra-easy pipe threading buy 65R at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO, U. S. A.

RIDGID Work-Saver Pipe Tools

Now's the time to mail this month's Readers' Service card.

Islands, Mariana Isles, Bahama, Capetown, Aden and Cairo.

Edward C. Uecker,
Water Distillation Division,
Cleaver-Brooks Co.,
Milwaukee, Wisc.

Editor's Note: The ship and port water supply problem was much more complex than was indicated in our editorial. For instance, even though ships were equipped with evaporation facilities, these were totally inadequate when two thousand men were loaded on a ship designed only for a crew of 40 or 50. Deck storage could not be used in most cases; cross-connections on shipboard were always a problem. Port water supply was even more baffling and offered almost insoluble problems. It is a matter of some pride to believe that, notwithstanding all of these difficulties, we are correct in saying that no army personnel contracted illness as a result of contaminated water on shipboard and no serious epidemic occurred in any port over which the army had control. In accomplishing this, we perhaps had good luck on our side.

• • •

BOOKS IN BRIEF

CHEMICAL FEED MANUAL

A new edition of the Chemical Feed Manual has been prepared by the Missouri Water & Sewerage Conference, State Office Bldg., Jefferson City, Mo. It is priced at $2.50.

ROADSIDES—THEIR USE AND PROTECTION

Special Report 17 of the Highway Research Board contains seven papers presented at a January symposium covering various phases of the subject. 48 pages, paper cover; available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C., at a cost of 75 cents.

STABILIZING ROADS WITH LIME

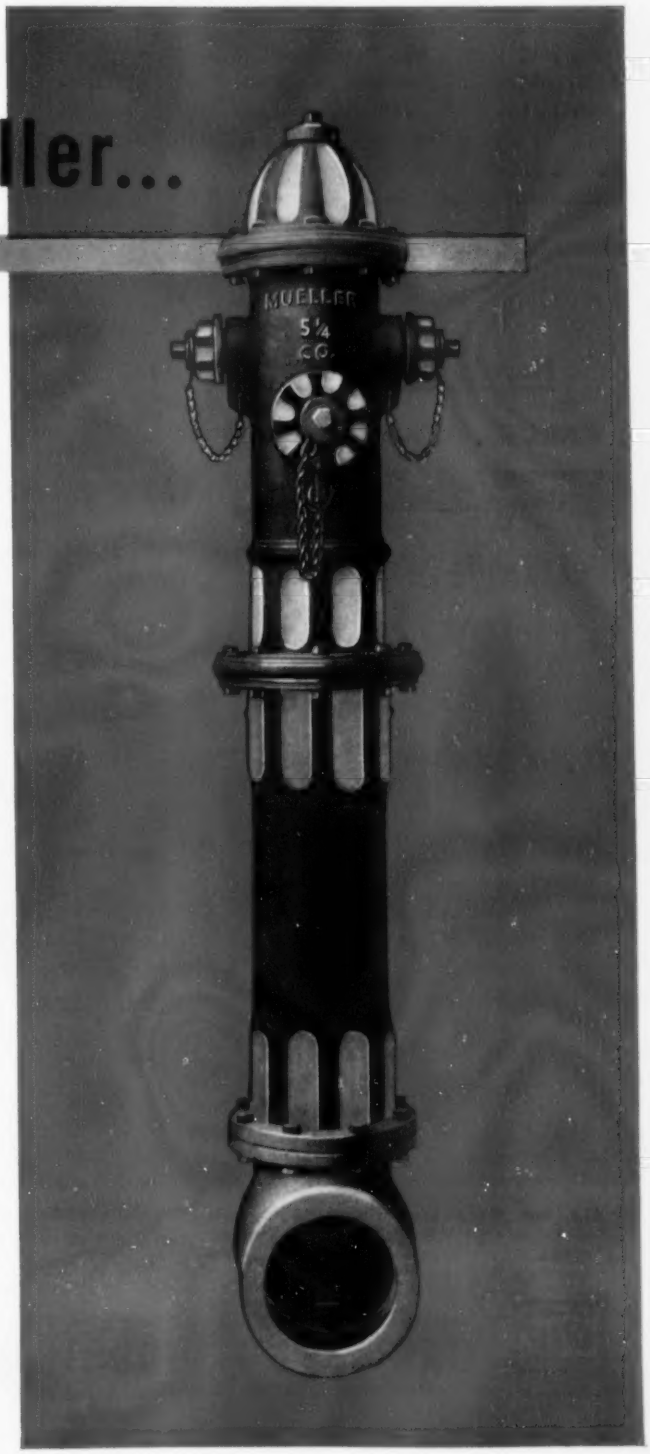
A 68-page book tells all there is to know about lime stabilization of roads, with the facts on 26 different projects using lime. There are 21 photographs and 21 combined graphs, charts and tables. In the bibliography are 24 different references. Single copies sent free. Ask for your copy from National Lime Association, 925 Fifteenth St., NW., Washington 5, D. C.

MUELLER

Specify Mueller...

and you get all of these improved Fire Hydrant features

- AUTOMATIC LUBRICATION
- SAFETY FLANGE CONSTRUCTION
- SAFETY STEM COUPLING
- DRY TOP DESIGN
- COMPRESSION TYPE MAIN VALVE
- DOUBLE AUTOMATIC DRAIN VALVE
- "O" RING SEALS
- FULLY BRONZE MOUNTED
- BREECH-LOCKED NOZZLES
- DESIGNED FOR ABOVE GROUND MAINTENANCE



Add Mueller Catalog A-201 to your Fire Hydrant catalog file. Write today.

MUELLER CO.

Dependable Since 1857

CHATTANOOGA, TENNESSEE

It's a fact... our handy Readers' Service card is the way to get new catalogs.

Detroit tests prove interesting facts about refuse collection units

Like a lot of other cities — Detroit, Mich., suddenly discovered that it had "*outgrown*" its sanitary system. Old methods and machines simply were *no longer adequate* to handle the vast new responsibilities imposed on them. So wise public officials acted promptly to provide modern rubbish disposal for Detroit's *500,000 homes and commercial establishments*. They studied the sanitation problem from every angle . . . made detailed "route tests" with every type of collection equipment. Result: the City of Detroit *ultimately purchased 453 Gar Wood Load-Packers* . . . a pretty good indication that Load-Packers are the best buy for your community, too. Contact your Gar Wood distributor today for complete details and a *free Load-Packer demonstration*.

Here's what

CARL D. WARNER

Commissioner

of Public Works

REPORTED . . .

Conclusions excerpted from a detailed article appearing in THE AMERICAN CITY Mar. 1954

"In order that we standardize on the best possible equipment for our needs, the department's Motor Transport Division and the Division of Sanitation were asked, jointly, to conduct exhaustive tests of the various makes and types of equipment.

"To approach this task from a scientific angle, we decided to *analyze the composition of normal loads.* Several thousand truck-loads of rubbish were separated and examined. From this study, we learned that *82% of all rubbish collected was burnable and could be sent to the incinerators.* Furthermore, since burnable materials are normally more bulky than nonburnable, our problem was one of *bulk rather than weight* . . .

"This automatically narrowed our choice of new collection equipment. *Trucks had to be equipped with fully enclosed, compaction-type bodies, able to reduce these compressible wastes into a solid, dense mass and thereby increase the load capacity.* Open trucks, certainly, were obsolete.

"Too, normal city expansion was moving our landfill operations to more remote locations. Thus, the greatly increased capacity of packing type bodies would substantially reduce number of trips to the dump.

"Experiments with various body designs further narrowed the field. Some types were found to be impractical in the narrow downtown alleys. Others, bulky in design, presented problems of maneuverability; some with complicated operating mechanisms presented hazards to safety.

"These extensive tests conducted by the Sanitation and Motor Divisions in conjunction with the manufacturers of packing-type units resulted in our decision to purchase 16-yard *Gar Wood* Load-Packers. *The powerful compaction, neat and orderly design, and low loading height, as well as simplicity and speed of operation, proved ideal for our work.* Today, we have 423 of these units in operation and 30 additional units scheduled for delivery."

453 Gar Wood Load-Packers now provide sanitary, low-cost rubbish disposal weekly over Detroit's 4200 miles of streets and alleys, to 4 incinerators and 7 sanitary landfills.

LP-1

GAR WOOD INDUSTRIES

GAR WOOD INDUSTRIES, INC.

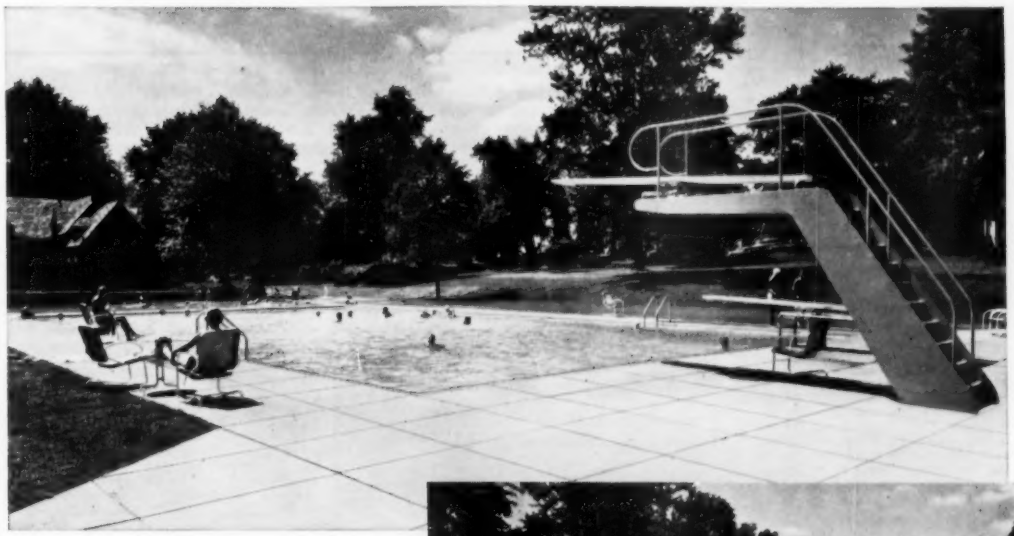
Wayne Division — Wayne, Michigan
Richmond Division — Richmond, Cal.

WORLD'S LARGEST MANUFACTURER OF DUMP BODIES AND HOISTS FOR TRUCKS AND TRAILERS

Get full details of this month's products . . . mail your Readers' Service card today.

Value– MORE FOR EACH DOLLAR

in beauty, permanence, low upkeep!

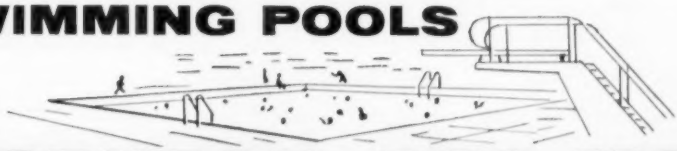


P•DM All-Steel Swimming Pool, 82'4" x 45'; Oakmont Country Club, Pittsburgh, Pa.

All-Steel

SWIMMING POOLS

by



PITTSBURGH • DES MOINES

In appearance, low maintenance and trouble-free long life, modern Pittsburgh-Des Moines All-Steel Swimming Pools provide top value for municipality, club or estate. Smooth-surfaced, sanitary, proof against cracking, these advanced-design pools are widely popular, time-tested, require but periodic painting for good-as-new permanence. Write!

PITTSBURGH•DES MOINES STEEL CO.

Plants at PITTSBURGH, DES MOINES and SANTA CLARA

Sales Offices at:

PITTSBURGH (25).....3442 Neville Island
NEWARK (2)...236 Industrial Office Bldg.
CHICAGO (3), 1246 First National Bank Bldg.
LOS ANGELES (48),....6399 Wilshire Blvd.
DES MOINES (8), 943 Tuttle Street
DALLAS (1), 1247 Praetorian Bldg.
SEATTLE.....550 Lane Street
SANTA CLARA, CAL., 649 Alviso Road

FREE EQUIPMENT DATA to Help Your PUBLIC WORKS PROGRAM

NEW LISTINGS

The engineering information in these helpful catalogs will aid you in your Engineering and Public Works programs. Just circle numbers you want on the coupon, sign and mail. This free Readers' Service is restricted to those actively engaged in the public works field.

Instrumentation and Control For Water Filtration Plants

47. In a comprehensive 16-page bulletin, illustrated with 41 sketches of typical installations, Builders-Providence, Inc., 345 Harris Ave., Providence 1, R. I. presents data on the complete line of flow meters, gauges and rate of flow controllers for water treatment plants. For your copy of Bulletin 100-K2 write to the manufacturer or check the handy coupon.

How to Get Better Grader Operation

111. A most interesting and instructive 20-page illustrated action booklet on how to operate a motor grader is now available from Galion Iron Works & Mfg. Co., Galion, Ohio. Designed to help operators get more effective use from the versatile motor grader, this booklet covers the hydraulic system, steering, tips on leaning wheels, proper blade positioning, turning, gear speeds and operating procedures. Colorful, easy-to-read presentation guarantees good readership. Check the coupon for your copy.

Convenient Source of Rubber for Road Improvement

128. "Surfa-Seal" Pellets, made in the form of small cubes containing 40% rubber hydrocarbons are now available for improving asphalt stability, providing low temperature flexibility and reducing hardening and stripping. A booklet which covers these advantages in detail and tells how the pellets are used and quantities required is offered by Naugatuck Chemical Div., U. S. Rubber Co., New York 20, N. Y. Just check the handy coupon.

What You Should Know About Welding Aluminum

133. Latest information on the technology of welding aluminum alloys is presented in a new book published by Aluminum Company of America, Pittsburgh, Pa. Though much of the information covers commercial welding procedures, the public works engineer will find a great deal of helpful material to assist him in specifying welded aluminum for structural applications and as components of equipment. Write direct to the manufacturer for copies, or check the coupon.

Catch Basins Cleaned With Hydraulic Excavator

80. Cleaning catch basins is one of the many jobs made easier with the versatile Pippin Excavator, which features complete hydraulic control for fast, inexpensive operation. Get all the facts on this useful machine—you'll see how it can be kept in continuous use on a wide variety of work. Write Pippin Construction Equipment, Inc., White River Junction, Vermont, or check the coupon.

Streamlined Data on Tractors, Scrapers and Power Units

102. The complete line of International Industrial Power products, 73 in all, is described in a new 48-page catalog just published by International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. Technical data has been streamlined, yet provides abundant descriptive material on each piece of equipment. Check the coupon for the latest on crawler and wheel tractors, scrapers, dozers and related attachments plus International Diesel, gasoline and gas power units.

Design Data on Trickling Filters

106. Complete details on the Walker "Retoseal" rotary distributor are presented in a 12-page illustrated bulletin offered by Walker Process Equipment Inc., 840 N. Russell Ave., Aurora, Ill. In addition, the bulletin contains discussions and data to assist in designing the complete trickling filter unit. Check the coupon for this informative bulletin.

Specialized Service Reduces Sewer Troubles

64. The services of a firm experienced in the cleaning and maintenance of sewers for municipalities and industries are ready wherever and whenever you need help. To see how your community can save money on sewer maintenance get information the facilities and know-how of Thomas Drain Service, 35 So. College St., Akron 8, Ohio. Check the coupon.

Modern Filtration for Swimming Pool Water

73. A colorful new bulletin that shows the operation of diatomite filters for swimming pool waters, outlines the advantages of this type of water treatment and provides helpful engineering data based on pool size has been published by R. P. Adams Co., Inc., 244 East Park Drive, Buffalo 17, N. Y. To get a copy, check the coupon today.

Convenient Reference Manual Covers Cast Iron Pipe, Valves and Hydrants

76. An 80-page manual, issued by R. D. Wood Co. Independence Sq., Philadelphia 5, Pa., presents specifications for "Sand-Spun" cast iron pipe and fittings, outlines types of joints available, lists dimensions and weights in convenient tables and includes, in addition, full engineering data on the Mathews fire hydrant and R. D. Wood gate valves. Check the coupon for this useful information.

More on Pages 34 to 50

Wire Fabric Reinforcement For Bituminous Resurfacing

138. Widespread interest in the use of welded wire fabric as reinforcement for bituminous resurfacing has lead to the preparation of a comprehensive booklet which presents detailed information on the subject. Published by the Wire Reinforcement Institute, Inc., Washington 4, D. C., the booklet presents data on a number of resurfacing jobs, covers results of research and provides recommendations according to the work to be done. Check the coupon to get your copy.

Wrought Iron Use In Sewage Treatment Plants

147. An interesting case study of the use of wrought iron in the Port Huron, Mich. Sewage Treatment Plant has been published in an illustrated folder by A. M. Byers Co., Pittsburgh 30, Pa. Wrought iron services include digester heating coils, gas piping, engine exhaust lines, steam supply lines and condensate returns. Be sure to investigate the use of this material in plant design. Check the coupon.

What's The Difference In Motor Graders?

154. This question, among many others is answered in a recent Caterpillar Tractor Co. publication titled "There's a difference in Motor Graders". This 8-page illustrated booklet discusses in detail the main points which should be considered before purchasing a motor grader. For copies of this informative booklet, form D441, write Caterpillar Tractor Co., Peoria, Ill., or check the coupon.

8-54

USE THIS COUPON to get detailed information on products and materials mentioned in this issue. Circle numbers below and mail today.

STOP READ AND SEND

Booklets from pages 32 to 50:

20 23 25 27 28 33 36 42 43 44
46 47 48 49 59 60 61 62 64 65
68 72 73 74 76 80 84 86 88 89
90 93 96 101 102 106 107 109 110 111
116 123 128 132 133 138 143 144 147 148
149 154 157 158 161 164 168 169 170 172
174 175 177 181 187 189 190 194 196 197
198 201 206 207 208 211 213 222 224 236
239 246 248 266 267 273 275 278 280 281
286 289 293 299 303 309 311 312 315 318
330 333 335 347 349 361 362 366 367 368
374

New Products, pages 138 to 140:

8-1 8-2 8-3 8-4 8-5 8-6 8-7 8-8 8-9 8-10
8-11 8-12 8-13 8-14 8-15 8-16 8-17 8-18
8-19 8-20

Name .....

Occupation .....

Street .....

City ..... State.....

NOT GOOD AFTER SEPT. 15, 1954 MAIL THIS CARD NOW

COMPARE

★ MANEUVERABILITY
★ VERSATILITY
★ QUALITY
AND COST

The Davis
Pit Bull
Patent Pending

Pit-Bull with Loader Attachment

Pit-Bull with Rotary Broom Attachment

Pit-Bull with Back-Hoe Attachment

11 Attachments . . . to 1 Basic Unit

Are you concerned with PROFITS, LOW BIDS, or BUDGETS?

Then take a look at the Davis ***Pit-Bull,*** specifically designed to give you several high-quality industrial machines with only one basic unit for low-cost versatility.

Any of the attachments can be fitted to the ***Pit-Bull*** in a few minutes, and another operation is underway with the same operator and the same mobile unit.

Trencher

Fork Lift

Rotary Mower

Dozer

Post Auger

Hammer

Swinging Crane

Cab Attachment

Model 100 Loader

The Davis ***Pit-Bull*** is a powerful hydraulic unit, fitted to any Ford or Ferguson tractor. Installation by your dealer includes a synchro-mesh transmission with underdrive. This installation provides four speeds in either direction and also permits changing directions instantly without shifting gears.

The seat, steering and controls are reversed, and operating levers are installed so the operator has finger-tip control over the ***Pit-Bull*** and the tractor at the same time.

The operator sits *comfortably* with a perfect view of the area.

The Davis ***Pit-Bull*** will outperform any conventional equipment, pound for pound and dollar for dollar.

GET THE FACTS

You, too, can cut your inventory cost, labor cost and maintenance cost yet have high-quality, versatile equipment. Send for our **FREE** booklet by filling out the coupon below and learn the specific facts about the New Davis ***Pit-Bull.***

The Davis PIT-BULL is manufactured by the makers of the Davis Model 100 Loader, America's Quality, Front-End Tractor Loader.

SEND THIS COUPON FOR FREE LITERATURE

MID-WESTERN INDUSTRIES, INC.
1009 S. WEST ST., DEPT P
WICHITA, KANSAS

Send me literature on the Pit-Bull ☐ I would also like literature on the DAVIS Model 100 Loader to fit a _____ tractor

NAME _____

ADDRESS _____

CITY _____ STATE _____

PB-2

MID-WESTERN INDUSTRIES, INC. 1009 S. WEST ST., WICHITA, KANSAS

Now's the time to mail this month's Readers' Service card.

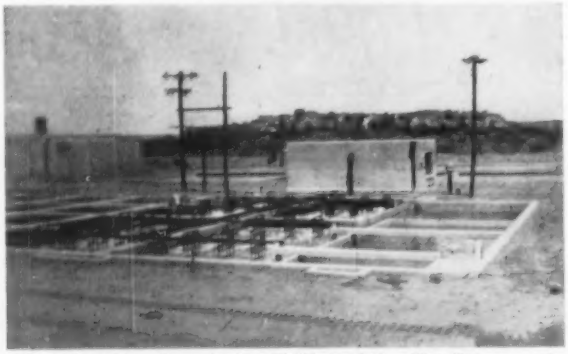
Since 1938 . . .

A PROVEN PROCESS

for economical, simple sewage treatment

Hays Submerged Contact Aeration

for SMALL CITIES, SUBDIVISIONS, INSTITUTIONS



City of Big Spring, Texas. Design: 20,000 population, 80 gallons per capita, 0.17 lb B.O.D. with additional capacity for certain industrial wastes.

8 OUTSTANDING ADVANTAGES of which

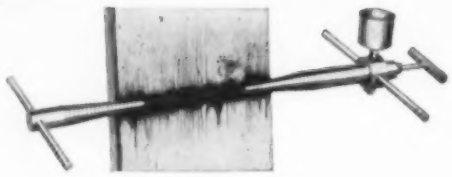
5 *Odorless and insect free.* Properly operated plants have no odor, no flies and can be installed within a short distance from dwellings.

The 3 other big advantages are being told in other ads—or

For fully descriptive literature Engineers are invited to address:

HAYS PROCESS COMPANY P. O. Box 768, Waco, Texas

Greenlee Bolt Hole Treaters



assure maximum life for poles, piles, timbers

Prevent decay around holes bored in new or old poles and timbers by pressure-treating each hole bored in the field. It's a simple operation with a GREENLEE Bolt Hole Treater. Treats the *entire* hole . . . forces preservative into all the wood cells around the bolt hole. Simply pour preservative in Treater cup until hole and cup are full. Pull back on handle, spring return does the work. Two models. Write for details. Greenlee Bros. & Co., 1748 23rd Avenue, Rockford, Illinois.

GREENLEE

Replacement Parts For Dragline Buckets, Scarifiers and Grouser Tips

161. A 28-page catalog covering replacement parts for any make or model of dragline bucket, plus information on scarifier shanks and points, weld-on grouser tips and sheeps foot caps and pedestals has been issued by Electric Steel Foundry Co., 2141 N. W. 25th Ave., Portland 10, Oregon. To get a copy, just check the coupon.

Pneumatic Operated Control For Water Treatment Plants

172. Engineering data on the application of pneumatic operated control systems for measurement and control in water treatment plants is the subject of a colorful 8-page bulletin, No. 5421, issued by General Filter Co., Ames, Iowa. Diagrams show basic elements and their use. Specifications cover flow controls, level controls and gauges. Check the coupon for this interesting bulletin.

How Masonry Structures are Preserved and Restored

194. A handsome booklet, lavishly illustrated, covers years of experience in the preservation, strengthening and restoration of masonry structures by the Penetryn System, Inc., Railroad Ave., Albany 5, N. Y. Numerous case histories show pressure permeation and consolidation, pressure concrete restoration and encasement and rehabilitation of structures above and below water line. Check the coupon for your copy.

●

STREETS AND HIGHWAYS

Attachments Keep Snow-Thrower On Job the Year 'Round

46. A variety of attachments designed to fit the rugged tractor unit of the Maxim Snow Thrower make it an all-year worker ready for mowing, cutting, dozing, towing and rolling. Full details on these economical snow throwers and their useful attachments are covered in bulletins offered by Maxim Silencer Co., 85 Homestead Ave., Hartford, Conn. Check the coupon for this data.

What You Should Know About Concrete Culvert Construction

61. An excellent reference book published by the Portland Cement Association, 33 West Grand Ave., Chicago 10, Ill. presents a discussion of culverts and conduits from the viewpoint of the engineer who must design them. Fundamental considerations; practical methods by which economical drainage structures may be chosen, properly located and correctly designed; procedures which permit shortcut designs without extended analysis; and illustrative examples are included in this helpful publication. Write to PCA or check the coupon for your copy.

Helpful Installation Manual For Drainage Structures

62. A 46-page manual, well worth careful study by designers and field engineers dealing with drainage structures, culverts, sewers or conduits, is offered by Armco Drainage & Metal Products, Inc., Middletown, Ohio. Proper location of the structures, base preparation, assembly and backfill are some of the many items covered in detail. Use the handy coupon for free copy.

Uniform Salt and Cinder Spreading at All Speeds

93. Be sure to investigate the hydraulically operated ground drive offered by Baughman to give you the advantages of two drive speeds and uniform distribution of material regardless of truck speed, but without the need for power takeoff or transmission. Full data on this and many other features in Form A-380. Baughman Mfg. Co., Jerseyville, Ill.

Grading Can Be Faster, Cheaper and Easier

96. You'll like every feature of the Austin-Western 99H Grader. It has all-wheel drive, all-wheel steer, controlled traction, precision sideshift and a high lift, extreme reach, reversible blade. Get data from Austin-Western Co. Aurora, Ill.

1 yd. Jaeger Load-Plus easily loads biggest trucks

This loader gets its chin up

Higher: 8′2″ under lip, 10′4″ under hinge
Farther: 24″ reach — Faster: in only 4½ seconds

Count how many times a day a loader dumps. That's the multiple of the time saved with this high-reaching, fast-dumping Jaeger Load-Plus. By every measurement of clearance, reach, hoisting speed and clean dumping action it out-performs and out-produces any other loader in its class.

From "carry" position it takes only 4½ seconds to reach maximum dumping height. Trigger-fast bucket control is provided by a separate hydraulic pump and double-acting rams. The large capacity of this pump enables your operator to control bucket loads up to 5000 lbs. with finger-tip ease, dump fast or slow, and place loads anywhere he wants them.

Maximum dumping angle of 50°, and flared 76″ wide bucket lip (extends beyond tires) insure faster, cleaner discharge than ever before. You can also shag or rack the bucket to scour out gumbo or other sticky materials.

A float valve (standard equipment) lets you throw the bucket control into neutral for floating-bucket cleanup work around stock piles, or to clean gutters and pavements without cutting into the surface.

Have your Jaeger distributor show you a Load-Plus at work — or ask us for Catalog L100-3.

Load increases traction because it's centered on the driven front wheels. Hoisting crowds bucket 13″ deeper into pile.

Turns in only 14 ft. radius with power-steered rear axle. 5 speeds to 28.2 mph reverse, 18.7 forward.

THE JAEGER MACHINE COMPANY

400 Dublin Avenue, Columbus 16, Ohio

AIR COMPRESSORS • PUMPS • CONCRETE MIXERS • TRUCK MIXERS • PAVING MACHINES

Get full details of this month's products . . . mail your Readers' Service card today.

To order these helpful booklets check the coupon on page 32.

Bitumuls Paving Handbook Full of Useful Data

23. The latest edition of the Bitumuls Paving Handbook covers a wealth of practical data on paving methods and materials, road and airport paving specifications and construction details, complete tabular data on asphaltic binder applications and aggregate requirements, condensed Asphalt Institute specifications plus data on Laykold compounded asphalts for flooring, tennis courts, protective coatings and waterproofing. You can have a copy by checking the coupon. American Bitumuls & Asphalt Co., 200 Bush St., San Francisco 4, Calif.

How to Save Time on Curb and Gutter Work

143. Every type of curb and gutter work is illustrated in the 12-page Heltzel catalog on steel forms for building concrete curbs, gutters and sidewalks. Time-saving setups show how to speed up the job and save money. Get your copy from Heltzel Steel Form & Iron Co., Dept. PW, Warren, Ohio.

Think of Aerial Surveys When You Need Maps

311. Every engineer and public official should investigate aerial surveys for maps of new areas, up-to-the-minute maps for city planning, highway relocation, surveys to plan extensions of sewers, water mains and utilities. Precise contours for topographic maps and other data in any detail desired can be furnished by Aero Service Corp., 236 Courtland St., Philadelphia 20, Pa. Interesting booklet on aerial mapping services and methods available by checking the coupon.

Snow Removal Problems And How to Solve Them

318. Effective snow removal demands the use of the proper equipment. For latest data on the full line of Gledhill reversible and one-way plows, V-Type plows, sturdy push frames and frame hitches, get the bulletins offered by Gledhill Road Machinery Co., Galion, Ohio. Just check the coupon.

Cut Road Building Costs With A Tamping-Leveling-Finisher

175. For a full description of roadbuilding methods with a tamping-leveling-finisher which lays a smooth mat without forms, tamping and compacting to desired grade, get Bulletin 879-A from Barber-Greene Co., Aurora, Ill. Check the coupon today.

Get Data Now On This Catch Basin Cleaner

198. Simple powerful pneumatic bucket is featured by Netco Catch Basin Cleaner. Folder 33A gives details and illustrates operation of complete self powered truck mounted unit. Netco Div., Clark-Wilcox Co., 118 Western Ave., Boston 34, Mass.

What Should You Look For In a Power Sweeper?

206. Helpful information to aid you in the selection of a power sweeper to fit your needs is provided in Bulletin 85.2, issued by G. H. Tennant Co., 2530 N. Second St., Minneapolis 11, Minn. Full data on the highly maneuverable Tennant Model 75 Sweeper is included. Get your copy by checking coupon.

Ice Control Without Corrosion Dangers

208. Virtually all corrosion is prevented when rust inhibitor "Banox" is used in conjunction with salt for snow and ice control. Properties of this material and performance results are described in bulletins issued by Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa. Check coupon for your copies.

Get Full Data On Aggregate Spreaders

286. Accurate control for spreading crushed rock, chips, sand or ice control materials is featured by all models of Highway Equipment Co. materials spreaders. Data on both trailer and tailboard types available by checking the coupon. Highway Equipment Co., 630 D. Ave., Cedar Rapids, Iowa.

Portable Melting Furnace For Rubberized Joint Sealers

213. The Hauck double jacketed melting furnace uses L-P gas as fuel and a high flash point oil for heat transfer to assure close temperature control when melting rubberized joint sealers of all types. All details on this 16-gallon capacity unit are furnished in Bulletin 1081. Check coupon for your copy. Hauck Mfg. Co., 124 10th St., Brooklyn 15, N. Y.

The Bros Line of Road Machinery

289. An illustrated folder describing the Bros line of road machinery is available from Wm. Bros Boiler & Manufacturing Co., Minneapolis 14, Minn. Full descriptions of Bituminizer distributors, Spraymatic spray bars, several types of compacting equipment and other units are included. Check the coupon.

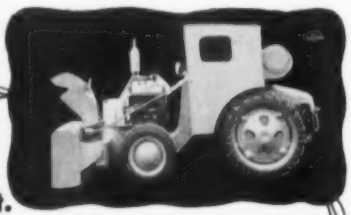
Snow Plows for Every Street and Highway Need

335. For details on the full line of Frink Sno-Plows, including the new taper-type reversible plow with hydraulic roll-over control, reversible trip-blade plows, Vee plows and all accessories, check the coupon today. Frink Sno-Plows, Inc., Clayton, N. Y.

CONSTRUCTION EQUIPMENT AND MATERIALS

Details on Motor Grader Construction and Use

312. In a handsome catalog, profusely illustrated with diagrams and photographs of unusually fine quality, the Galion Iron Works and Mfg. Co., Galion, Ohio, has presented all details on the construction and operating features of their Model 118 motor grader. This impressive 28-page catalog, No. 375, is available without charge. Just check the coupon.



throws 2400 sq. ft. of SNOW PER MINUTE

The Maxim Model 248 Snow Thrower is fast and powerful . . . 31 h.p. on the thrower alone, with a separate driving engine, 4 forward speeds plus reverse . . . compact enough to clear the average sidewalk (48" wide) without damaging turf. Machine turns on a 10' radius; can climb an 8" curb. Easy to drive and control. Readily converted for use with all-year-round attachments.

ALSO . . .

Maxim Models 628 and 728 have maximum speeds of 230 and 375 ft./min., capacities of 535 and 874 sq. ft./min., 7.5 h.p. engines. Thousands in use from coast to coast.

Write Dept. TW for details

THE MAXIM SILENCER COMPANY
128 Homestead Avenue, Hartford 1, Conn.

MAXIM SNOW THROWERS

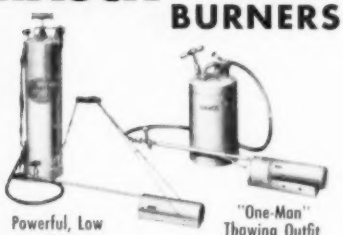
For Heating · Thawing · Melting · Drying

Torch Flame Thawing Outfit

Double Burner Thawing Outfit on Wheels

Superheated Steam Thawer

HAUCK THAWING BURNERS

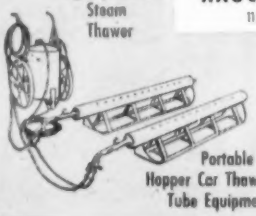


Powerful, Low Cost Flame-Gun

"One-Man" Thawing Outfit

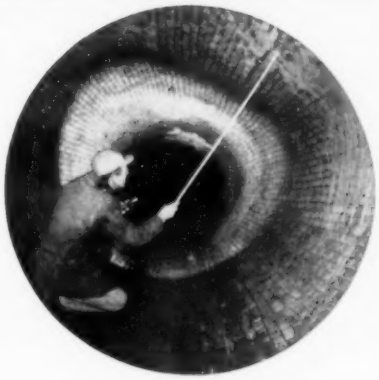
When cold weather strikes, keep material, maintenance and production moving at very near normal. Provide immediate heat with speedy, efficient Hauck Thawing Torches and Heaters. Produce flame temperature 2000° F. and radiated heat. Burn kerosene. Easy to use. Need no air compressor.

HAUCK MANUFACTURING CO.
117-127 Tenth Street · Brooklyn 15, N. Y.



Portable Hopper Car Thawing Tube Equipment

Portable Salamander



Note distorted crown of the old brick sewer.

Are Your Sewers Failing?

You won't know unless you look. Failing sewers often keep their secret until it is too late.

In Milwaukee, inspection showed an old 96-inch combined brick sewer was at the point of failure. Various materials were considered for the repair job, but Armco ASBESTOS-BONDED Sewer Pipe was finally selected. It was strong, corrosion-resistant and its installation would not disturb the existing structure or materially reduce the waterway area. The pipe was installed in 8- to 20-foot lengths, reducing the number of joints required. Costs were low.

Armco Corrugated Metal Pipe is also widely used for new sanitary and storm sewers as a safeguard against future trouble and expense. Why not write us today for details? And don't forget about planning an inspection for your present sewer. It may save trouble later on. Armco Drainage & Metal Products, Inc., 1974 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO SEWERS

ARMCO

Armco ASBESTOS-BONDED Corrugated Pipe in relined Milwaukee sewer. PAVED-INVERT protects against erosion.

Thousands use our Readers' Service card to keep up to date . . . do you?

To order these helpful booklets check the coupon on page 32.

Easy Reference on Durable Gratings and Treads

90. An easy-to-use catalog containing illustrations, descriptions and complete engineering data on grating-flooring, treads and floor armoring of riveted, press-locked and welded types has been published by Irving Subway Grating Co., Inc., 5009 — 27th St., Long Island City, N. Y. To get this useful reference write to the manufacturer and ask for Catalog F406 or check the handy coupon.

Helpful Manual on Bodies and Hoists

101. The Heil Body and Hoist Manual is a handy 68-page booklet designed to furnish all information needed for selection of the correct body and hoist unit for your needs. Body and hoist features, payload distribution, hoist capacities and full operating and maintenance instruction are a few of the items covered in this comprehensive manual. Check coupon or write The Heil Co., Milwaukee, Wis.

What You Should Know About Use of Power Cranes and Shovels

107. A series of eight articles discussing the use and application of power cranes and shovels has been compiled under one cover by the Koehring Co., Milwaukee 16, Wis. This 32-page booklet covers the basic principles of operations and cost, safety consideration and factors to consider in equipment selection. Get your copy of this valuable booklet by checking the coupon.

Booklet Helps Design of Custom-Engineered Steel Buildings

110. Custom-engineered Butler steel buildings are available in every size, type and design to meet your building needs. In a helpful 32-page booklet you will find details on several basic designs and an unlimited variety of door, window and interior treatments; answers to your questions on construction and erection; and many illustrations of typical uses. Use the coupon or write to Butler Mfg. Co., Kansas City, Mo.

One Basic Unit with Attachments Does a Multitude of Jobs

149. You'll find full descriptions of the Davis Pit-Bull unit and versatile, easy-to-change attachments in the handsome new bulletin of Mid-Western Industries, Inc., 1009 S. West St., Wichita, Kans. There's a loader, trencher, dozer, roller, mower, rotary broom, post auger, crane, hammer and lift fork —units for every type of municipal maintenance and construction job—all coordinated for use with the same powerful basic unit. Be sure to investigate this remarkable equipment. Get the full story by checking the coupon.

How the "Payloader" Helps Public Officials

190. An attractive new booklet "Getting More for the Tax Dollar with Payloaders" makes worthwhile reading for every public official in charge of construction and maintenance of roads, streets, and utilities. You will find illustrations and data showing dozens of ways the "Payloader" is used by cities, counties and states, plus convenient specifications on seven models. Check the coupon or write Frank G. Hough Co., 761 Seventh St., Libertyville, Ill.

Give Full Protection To Treated Poles and Timbers

267. Bolt holes in treated poles and timbers used for guard rails and structures can easily be the first point of decay. Now you can assure maximum life by using the Greenlee Bolt Hole Treater, a simple device that forces preservative into the wood cells. Bulletin 13-15 gives the details. Greenlee Bros. & Co., Rockford, Ill.

Versatile Road Wideners Improve Highways at Low Cost

374. In illustrated bulletins describing Apsco road wideners and base pavers you will find full data on two versatile pieces of road-building equipment that will help you hold down costs while bringing old roads up to present day standards. Get the full story today by checking the coupon or write to Blaw-Knox Equipment Div., Blaw-Knox Co., Pittsburgh, 38, Pa.

8 Reasons Why You Should Check the Jaeger Loader

207. In a profusely illustrated 16-page catalog devoted to the applications and special design features of the Jaeger "Load-Plus" tractor-loader unit, eight good reasons listed to back up the claim that this machine outproduces any other loader of its size. These include load capacity, balance, reach, maneuverability, automatic power adjustment by torque converter, instant reversal, multiple speed and ease of control. Check them all by getting a copy of Catalog L100-3. Check the coupon today. Jaeger Machine Co., 400 Dublin Ave., Columbus 15, Ohio.

●

SEWERAGE AND WASTE TREATMENT

How Cities Clean Sewer Lines From Street in One Operation

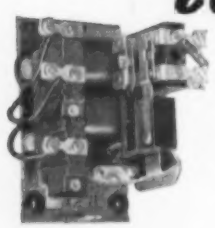
25. In a helpful 28-page handbook of sewer cleaning methods and equipment the makers of OK Champion sewer cleaners give full details of power and hand operated models. Also included are data on expansion buckets that take dirt from sewer to street in one operation, root cutters and other accessories. Get your copy by checking coupon. Champion Corp., 4752 Sheffield Ave., Hammond, Ind.

A Handbook of Sewer Cleaning Methods and Materials

44. Complete, easy-to-follow directions for every type of sewer cleaning operations and the equipment needed for effective cleaning work is covered in a 40-page booklet issued by Flexible Sales Corp., 3786 Durango, Los Angeles 34, Calif. Full details are provided on power cleaning machines, the SeweRodeR, hand tools and all accessories. Water main and culvert cleaning methods are included. Check the coupon for your copy of this helpful handbook.

B/W

All Electric FLOATLESS LIQUID LEVEL CONTROLS



The original—pioneered by B/W in 1933. No floats! No vacuum tubes! No moving parts in liquid. Literature describes relays and switches, automatic starter and relay combinations, multiple pump controls, special controls and panels and many application diagrams. Controls not affected by pressures, temperatures, acids, or caustics. Remote control if desired. Ice free electrodes where necessary.

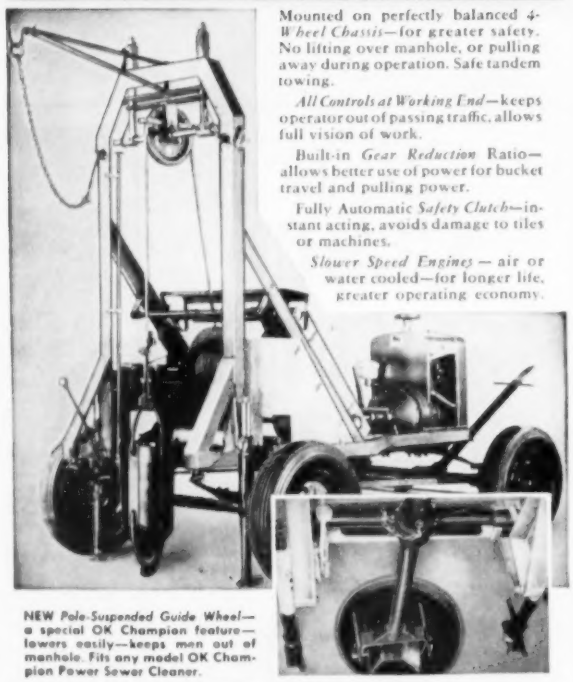
Write for Catalog

B/W CONTROLLER CORPORATION

2224 E. Maple Road, Birmingham, Mich.

FIRST IN THE FLOATLESS CONTROL FIELD

OK CHAMPION POWER SEWER CLEANERS



Mounted on perfectly balanced *4-Wheel Chassis*—for greater safety. No lifting over manhole, or pulling away during operation. Safe tandem towing.

All Controls at Working End—keeps operator out of passing traffic, allows full vision of work.

Built-in *Gear Reduction* Ratio—allows better use of power for bucket travel and pulling power.

Fully Automatic *Safety Clutch*—instant acting, avoids damage to tiles or machines.

Slower Speed Engines — air or water cooled—for longer life, greater operating economy.

NEW *Pole-Suspended Guide Wheel*—a special OK Champion feature—lowers easily—keeps men out of manhole. Fits any model OK Champion Power Sewer Cleaner.

Write for latest OK Champion Circular

CHAMPION CORPORATION • 4752 **Sheffield Ave.** • **Hammond, Ind.**

Metropolitan Beach serves more than three million people in the Metropolitan Detroit area. The beach itself is 300 ft. wide and 6,000 ft. long . . . fifty-five acres of fine sand stretching along the shores of Lake St. Clair. Capacity at the present time is approximately 35,000 persons per day. Facilities include bath houses and dressing rooms, a modern food bar, extensive game areas, and provision for parking 6,000 cars. Sewage treatment facilities were engineered by the Huron-Clinton Metropolitan Authority.

Wilfred Godard, Plant Operator, making chlorine adjustment on Builders Chlorinizer.

CHLORINIZER... Stands Guard at World's Largest Fresh Water Beach Development

When 30,000 Detroit residents take advantage of Metropolitan Beach on a sunny day, Builders Chlorinizer helps to solve the sanitary sewage treatment problem. The wide range feeding accuracy of Builders Chlorinizer is extremely important to the Metropolitan Beach Sewage Plant which must treat flows varying from 10,000 to 400,000 gallons per day.

Park Supt. Gerald W. Fairbanks reports the Chlorinizer has performed very satisfactorily since its installation in June 1951. The Huron-Clinton Metropolitan Authority gives the Chlorinizer a clean bill of health on maintenance, too. With the exception of two minor adjustments, no service work has been needed during the past three years.

Here is another example of the swing to Chlorinizer — for plant expansion, for new projects, for replacement. Find out for yourself why these modern chlorine gas feeders are gaining such wide acceptance. Send for descriptive bulletins, to Builders-Providence, Inc., 356 Harris Ave., Providence 1, Rhode Island.

BUILDERS-PROVIDENCE

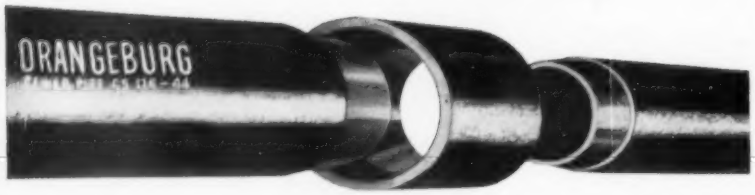
DIVISION OF B-I-F INDUSTRIES, INC.

BUILDERS IRON FOUNDRY • PROPORTIONEERS, INC. • OMEGA MACHINE CO.

BIF METERS FEEDERS CONTROLS

To order these helpful booklets check the coupon on page 32.

ORANGEBURG® ROOT PROOF PIPE



Modern, Sanitary, Dependable!

Over 1,000,000 installations, over 100,000,000 feet of Orangeburg Pipe in service! Orangeburg Root-Proof Pipe is for sewer lines from house to street main or septic tank, for conductor lines from downspouts, storm drains — and other non-pressure uses outside the home. Use Orangeburg Perforated Pipe for septic tank beds, foundation drains, all seepage drainage.

Water-Tight Joints . . . for the Sanitary Engineer

Orangeburg Root-Proof Pipe has the famous Taperweld Joint which seals water-tight and root-proof with a few light taps of the hammer. No unsanitary leaks — no over-burdening infiltrations.

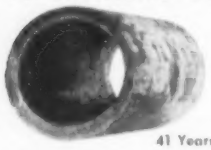
High Flow Capacity . . . for the Public Works Engineer

Orangeburg Pipe has very low friction losses due to its smooth bore. Under equal conditions both pipe and joint deliver equal or greater flow than other pipes.

Easy to Assemble . . . for Plumbers and Builders

The long 8-foot lengths are light and easy to carry. Longer lengths mean fewer pieces to handle, fewer joints to make. Pipe can be sawed to any length and Orangeburg Fittings are made especially for Orangeburg Pipe.

For the Home Owner . . . High Quality and Economy



41 Years Underground

Orangeburg Pipe is strong, tough and resilient. It resists corrosion, acids and alkalies found in sewage wastes — all underground conditions. With Orangeburg the quality is high — the cost surprisingly low.

An independent investigation of Orangeburg installations by a prominent sanitary engineer has substantiated the fact that Orangeburg is an excellent material for sewage disposal.

A summary of this report will be sent on request. Write Dept. PW84.

BE SURE TO GET GENUINE ORANGEBURG. LOOK FOR THE TRADE MARK ON THE PIPE.

Use Orangeburg Fittings with Orangeburg Pipe. They simplify installations and cut costs.

ORANGEBURG MANUFACTURING CO., INC. • Orangeburg, New York
West Coast Plant: Newark, Calif.

Get full details of this month's products . . . mail your Readers' Service card today.

What You Should Know About Trickling Filter Underdrains

20. Specifications for vitrified clay underdrain blocks conforming to ASTM standards, suggestions for layout and construction of trickling filter floors, dimensions of standard blocks, channel covers, angles and other fittings are available from the Trickling Filter Floor Institute, c/o Editor, Public Works, 310 E. 45th St., New York 17, N. Y. Check the coupon and we will forward your request.

Useful Design Data On Clarifiers

65. Designers and engineers will find a wealth of helpful information on Dorr Clarifiers for water, sewage and industrial waste treatment in an attractive bulletin issued by the Dorr Co., Stamford, Conn. Units for round and square tanks in diameters from 12 to 200 ft. are fully specified and illustrated. Check the coupon for your copy.

Effective Shredder For Dried Sewage Sludge

72. The rugged and compact Royer Sludge Disintegrator does a quick and effective job of preparing sludge for use as a fertilizer on city properties or for sale to others. Several models, portable and stationary, suitable for every size plant and power source are described in Bulletin 643-A, issued by the Royer Foundry and Machine Co., Kingston, Pa. Get a copy by checking the coupon.

High Rate Filters For Sewage Treatment

74. Accelerated biological oxidation in treatment of sewage and other organic wastes is a feature of Infilco's Accelo Filter system. Bulletin 6200 explains the direct recirculation principle, shows plant layouts, and gives performance data. For your copy write Infilco Inc., Box 5033, Tucson, Ariz., or check handy coupon.

A Short Course In Pipe Jointing

169. The story of rubber couplings for clay and concrete pipelines is graphically presented in the booklet "Pipe Enterprise", published by Hamilton Kent Mfg. Co., Kent, Ohio. Detailed description of pipe jointing methods; photos showing jobs where Tylox gaskets met the need for easily assembled, permanently tight joints installed under all conditions; and a report on the development, manufacture and outstanding features of the compression type gasket make this booklet valuable to every engineer and contractor. Check the coupon for free copy.

Factors in Selecting Chlorine Gas Feeders for Sewage Chlorination

181. A technical data sheet, number 840-137, has been prepared as a guide in the application of chlorine for sewage treatment. The purposes of sewage chlorination, types of chlorination, points of application, control methods, types of feed and feeders and equipment location are discussed. Check the coupon or write to Builders-Providence, Inc., 345 Harris Ave., Providence, R. I.

Data Offered On Mixed Flow Pumps

201. Data on the complete line of Worthington Mixflo pumps of the two-vane, non-clogging sewage type is offered in 16-page bulletin W-317-H16. Salient features are outlined, typical sections, performance curves and general data for five types are included. Helpful charts aid shafting selection. Copies available by using coupon or from Worthington Corp., Harrison, N. J.

Chemicals Used in Water, Sewage and Waste Treatment

248. A 16-page technical bulletin offered by Omega Machine Co., 345 Harris Ave., Providence, R. I., compiles in convenient form full information on the chemicals used in water, sewage and waste treatment. Data includes formulas, common names, commercial strengths, forms in which they may be obtained, sizes of shipping containers, and many other items, including recommendations for handling and feeding. Get this useful bulletin by checking the coupon.

SPEEDY SOLUTIONS TO WIDESPREAD PROBLEMS

This 33 x 45 ft. AERO photo-mosaic gives Philadelphia Electric Co. officials quick, up-to-date answers to engineering problems throughout a 4 county service area. Formed from 806 precise aerial photos, it provides detailed coverage for 2340 sq. mi.

For municipalities, too, AERO photo-mosaics and topographic maps save valuable time, money and manpower. Cities like Raleigh, N. C., Cleveland, Ohio, Ottumwa, Ia. and many others put them to such uses as planning for sewage and drainage problems, subdivision layout, road planning, city planning and development, traffic studies and civil defense.

AERO can map your city for far less than you think. The job can be done quickly—at a fraction of the cost of ground surveys. Write us for a budget figure.

AERO SERVICE CORPORATION

Philadelphia 20, Pennsylvania

Oldest Flying Corporation in the World

AIRBORNE MAGNETOMETER SURVEYS
PRECISE AERIAL MOSAICS • TOPOGRAPHIC MAPS
PLANIMETRIC MAPS • RELIEF MODELS • SHORAN MAPPING

Affiliates:
AERO SERVICE CORPORATION *(Mid-Continent)*, TULSA
AERO SERVICE CORPORATION *(Western)*, SALT LAKE CITY
CANADIAN AERO SERVICE, LTD., OTTAWA

Need more facts about advertised products? Mail your Readers' Service card now.

To order these helpful booklets check the coupon on page 32.

Packaged Sewage Treatment—Just Right for Small Places

36. "Packaged" Sewage Treatment Plants specifically developed for small communities—100 to 3,000 population. Write for full description and actual operating data for this type of plant. Chicago Pump Co., 622 Diversey Pkwy., Chicago 14, Ill.

Design Data Offered On The Spiragester

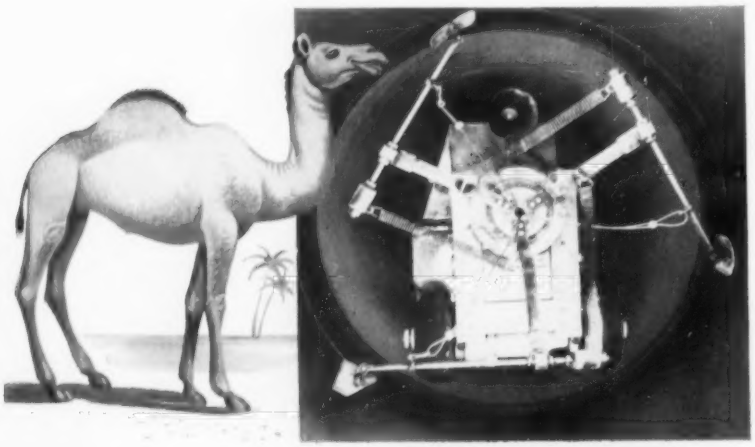
42. The Spiragester, a unit which combines the Spirafio Clarifier and a digestion compartment in a two-level arrangement to save space and reduce construction costs, is fully described in Bulletin 124 released by Lakeside Engineering Corp., 222 West Adams, Chicago, Ill. Design details, including capacities for 8' to 24' units are furnished together with typical plan and elevation. Check the coupon for this helpful bulletin.

How to Dispose of Sewage and Industrial Sludges

281. Get full information on the C. E. Raymond System of combined incineration and sludge drying providing high temperature deodorizing for nuisance-free sludge disposal. Flexible layouts fit large and small communities. Use handy coupon or write Combustion Engineering Inc., Raymond Div., 200 Madison Ave., New York 16, N. Y.

Get the Facts on The Contact Aeration Process

303. Full engineering details on the submerged contact aeration process of sewage treatment, including diagrams of plant units, area requirements, operating costs and other details are available in a bulletin of the Hays Process Co., Box 768, Waco, Texas. Check the coupon to get the facts.



CENTRILINE → Aden

goes to

Deep in the middle east, Centriline is currently centrifugally lining 11,920 feet of salt water mains for the Anglo Iranian Petroleum Company's Aden Refinery. The mains vary in diameter from 24" to 74" and are being lined with cement mortar in thicknesses of from ⅜" to ¼". The General Contractor, George Wimpy & Co. of England and the Pipe & Erection Contractor, Bechtel International Corp. of San Francisco, selected the Centriline process for the same reasons that have made it famous across the United States . . . guarantee against interior leakage, corrosion and tuberculation . . . low pumping costs . . . and high carrying capacity. Whether old or new, when a pipe is Centrilined its life is extended indefinitely. For complete details, call on Centriline today.

3,000,000 FEET OF EXPERIENCE

CENTRILINE CORPORATION

A subsidiary of Raymond Concrete Pile Co.

140 CEDAR STREET • NEW YORK 6, N.Y.

Branch Offices in Principal Cities of United States and Latin America

CEMENT-MORTAR LINING OF PIPES IN PLACE

Thousands use our Readers' Service card to keep up to date . . . do you?

Reference Book on Lubricated Plug Valves

273. Lubricated plug valves, including stick-proof lever sealed valves for easy operation and positive mechanical seal are fully described in reference books issued by Homestead Valve Mfg. Co., Box 550, Coraopolis, Pa. Check the coupon for your copy.

Submersible Sewage Ejector Simplifies Installation

275. The Weil submersible non-clog sewage ejector is a compact unit with a completely sealed motor, available in several sizes with capacities up to 300 gpm. For details on unit selection, installation methods, construction features and controls get Bulletin SE-860A from Weil Pump Co., 1530 No. Fremont St., Chicago 22, Ill. Check the coupon.

Helpful Data on Bermico Pipe Fittings

280. Data are now available on fittings for use with Bermico sewer pipe and perforated pipe—T's, Y's and bends to make complete root-proof, water tight, corrosion-resistant Bermico pipe systems. Get full information by checking to coupon. Brown Co., 150 Causeway St., Boston, Mass.

WATER WORKS

Data on Cutting-In Valves, Repair Sleeves and Accessories

33. A variety of Clow products for installation and repair of cast iron pipe lines, including the Eddy cutting-in valve and sleeve, split sleeves for pipe repair, test plugs, valve boxes, Strickler pipe cutters and other fittings and accessories are featured in literature available from James B. Clow & Sons, Inc., Box 6600-A, Chicago 80, Ill. Check the coupon.

Meters and Instruments For Water Works

43. An attractively arranged 20-page booklet issued by Sparling Meter Co., Box 3277, Los Angeles 54, Calif., furnishes concise data on the full line of Sparling meters, indicator-totalizer-recorder instruments and other special instruments and controls. Check the coupon for your copy.

Theory and Application Of the Flow Tube

84. Hydraulic formulae, head capacity curves and test data for this primary metering element are given in a technical bulletin, "Theory and Application of the Flow Tube," available from Foster Engineering Co., Union, N. J. Check the coupon for a copy.

Theory of Controlled Digestion With Floating Cover Tanks

88. In an excellent 40-page booklet, an authoritative discussion of digestion theory and practices, including design, operation and economics is presented by the Pacific Flush Tank Co., Chicago 13, Ill. Complete data are given on the use of floating covers, together with details on tank construction, piping and control chambers. Requests for this valuable booklet must be made on business letterhead.

Heavy-Duty Pipe Cutter Works In or Out of Trench

164. Built to stand the most severe service, the all-purpose Ellis & Ford pipe cutter, for cast iron water mains 4" through 12", is easy to use in tight places, works in or out of trench. Full details on cutter and interchangeable parts in Catalog 37, available by checking coupon. Ellis & Ford Mfg. Co., Ferndale 20, Mich.

Pipe Joint Essentials and Couplings for Every Job

168. Superior pipe joints are tight, flexible, simple, strong and economical. Dresser's handsome 34-page bulletin No. 513 shows how these essentials are met and provides layouts for curves, working pressures and a wealth of other data. Be sure to check this bulletin on the coupon. Dresser Mfg. Div., 59 Fisher Ave., Bradford, Pa.

Look at this Cheaper Way to Load Materials

BARBER BG GREENE

BUCKET LOADERS

If you load sand, gravel, cinders, chemicals, fertilizers or other bulk materials, look at this self-propelled, pneumatic-tired B-G Bucket Loader.

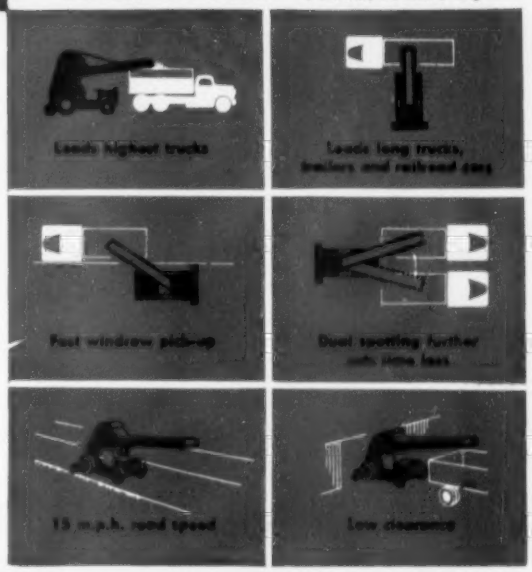
Cost figures prove it to be the most economical way to load trucks. The savings in truck time alone will justify its purchase. For, thanks to the B-G constant flow principle, it will load hour after hour at a rate of 3 cubic yards per minute. Capacity does not fluctuate with operator fatigue or zeal. Requires *only one man* to operate it.

The Barber-Greene Model 543 Bucket Loader can be converted to the Model 544 Loader which loads coal at 5 tons per minute and snow at 11 yards per minute.

There is a Barber-Greene Distributor nearby who will demonstrate how you can reduce costs with a Barber-Greene Bucket Loader.

Write for illustrated catalogs on Pneumatic-tired 543 or Crawler-mounted 82-A.

LOOK AT THIS VERSATILITY!



Barber-Greene

Aurora, Illinois, U. S. A.

Now's the time to mail this month's Readers' Service card.

To order these helpful booklets check the coupon on page 32.

Technical Data on Fluorides And Other Chemicals

48. Technical data on fluorides and other chemicals will be found in a comprehensive booklet issued by Blockson Chemical Co., Joliet, Ill. This helpful 60-page booklet includes a great deal of general information of value to water works men. Get a copy by checking the coupon.

Helpful Data on Water Works Products

49. A completely new catalog covering the entire line of water distribution and service products offered by the Mueller Company, of Decatur, Ill., is now available to engineers and water works superintendents. The 328-page catalog features an easy-to-use sectional indexing arrangement to facilitate quick reference to any of the hundreds of products listed. A large section of useful engineering information is included. Check the coupon today.

Meter Features That Help Make Water Works Profitable

59. Simple design, accuracy and long life, moderate first cost and inexpensive maintenance are features of American water meters described in Bulletin No. 50 of the Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y. Be sure you have this informative booklet which gives the details of American meter design and construction plus full data on sizes, capacities and dimensions. Get your copy by checking the coupon.

Discussion of Ranney Method For Municipal Water Production

116. A very interesting study of municipal and industrial water supply problems and a complete discussion of Ranney Collectors for water production will be found in a 20-page booklet published by Ranney Method Water Supplies, Inc., Box 277, Columbus 9, Ohio. Water quality, construction methods, costs, performance and other topics are considered. Check the coupon to get your copy.

For Fast, Smooth Pipe Cuts

68. Descriptive literature on the Reed 4-wheel hinged pipe cutter which operates in close quarters, gives quick, easy right-angle cuts, is available from Reed Mfg. Co., Erie, Pa. Check the coupon.

Design Data on Chemical Flocculating Equipment

89. Flash mixers, Straightline mixers, conveyors and elevators for handling chemicals are described in illustrated Bulletin No. 2442 available from Link-Belt Co., Colmar, Pa. Selection tables and diagrams are provided to help you select the equipment best suited to your needs. Check the coupon for your copy.

Rapid Sand and Pressure Filter Data

109. Rapid sand filters. A complete line of vertical and horizontal pressure filters, wooden gravity filters, and filter tables and other equipment. For engineering data, write Roberts Filter Manufacturing Co., 640 Columbia Ave., Darby, Pa.

Pollution-Proof Outdoor Drinking Fountain

144. An outdoor drinking fountain so designed that contamination by cross connections or back siphonage is not possible is fully described in a 4-page bulletin. Features neat appearance, easy installation. Write Murdock Mfg. & Supply Co., 426 Plum St., Cincinnati 2, Ohio, or use coupon.

Faster Pipe Laying With Precaulked and Threaded Joints

148. McWane 2" cast iron water pipe with threaded joints and precaulked bell and spigot pipe are described in folder WM-47. Additional data on 3" to 12" centrifugally cast pipe and fittings in folder WL-47, both issued by McWane Cast Iron Pipe Co., Birmingham 2, Ala.

Engineering Data On Gravity Filter Design

170. The complete line of gravity filters and related accessories furnished by the Permutit Co., New York 36, N. Y., is covered in a well-illustrated 24-page booklet. Each element of a filter and filter controls are discussed in detail to assist the designer of these important units. Get your copy of this helpful publication by checking the coupon.

All-Electric Floatless Liquid Level Control

174. Description of operating principles and application of B/W controls show the simplicity and many uses of these all-electric, floatless devices. Get latest bulletins for engineering data, diagrams of typical installations and details of component parts. Check the coupon or write B/W Controller Corp., Dept. PW, Birmingham, Mich.

Assistance in Planning Electrical Systems

189. On every water and sewage plant expansion, modernization or new construction job, you can get valuable assistance in planning the electrical system from Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa. Be sure to investigate compact, unitized Westinghouse equipment which conserves building space and simplifies maintenance. Check the coupon for full data.

Complete Booklet on Pipe Line Equipment

246. Equipment for all types of jointing, maintenance and repair jobs on water, gas and sewer lines is described and illustrated in Catalog No. 25 issued by Joseph G. Pollard Co., New Hyde Park, N. Y. Leak detectors, pipe finders, melting kettles, cleaning tools and a full line of hand tools for water and sewer departments, and many other items are included. Be sure to get your copy now. Just check the coupon.

SAMSON

BACKHOE
CRANE
SHOVEL

LOW-COST OPERATION!

SEWERS • DITCHING • MAN HOLES • SNOW REMOVAL • WATER MAINS • PAVEMENT REMOVAL • PIPE LINES

When SAMSON moves on the job, costs go down. The one-man, all-hydraulic operation is easing the budgets and work loads of many municipalities. SAMSON mounts on a standard truck chassis, and is rated at ¼ yd. capacity. The shovel bucket lifts to 12 feet, the back-hoe digs to 11 feet, and the crane can lift 2000 pounds over 18 feet high. The 180 degree boom swing allows for neat, close work. New improved features like the heavy duty valves, direct drive pump and the chain and sprocket drive mean a minimum of "down time". Operates for approximately 25 cents an hour, and trenches up to one yard a minute.

WRITE FOR THE NEW SAMSON FOLDER—see your dealer.

AVERY TRACTOR INC.
SAMSON
BACKHOES • CRANES • SHOVELS
US 20 WEST LEBANON, N.Y.

LONGER RANGE—TARGET VALUE FOR YOUR HIGHWAY TRAFFIC SIGNS WITH GROTELITE REFLEX REFLECTIVE SHEETING

Grotelite
REFLECTIVE SHEETING

SMOOTH
S S
SURFACE

This highly reflective, smooth surface reflex reflective sheeting makes a smashing, attention-compelling sign with longer range target value and full range legibility. Easily read night or day. The smooth, durable, self-cleaning surface can be screened, sprayed or brushed. It is easy to apply and makes the best long life, economical signs and markers. Available in sheets and completed signs.

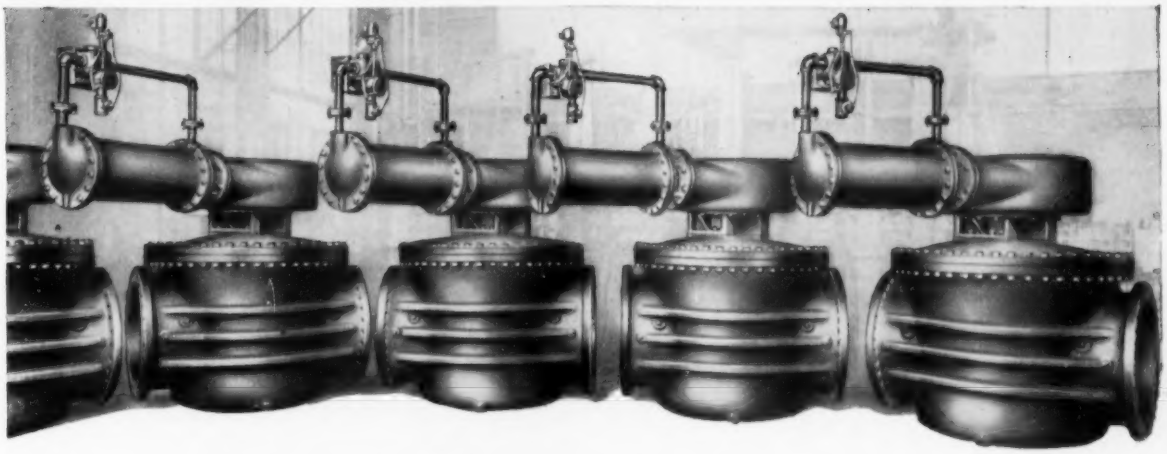
STOP

THE Grote MANUFACTURING CO., Inc.
GROTE SQUARE - BELLEVUE, KY.
(Established 1901)

Complete Line of Embossed Metal Traffic Signs, Reflectors and Street Name Plates

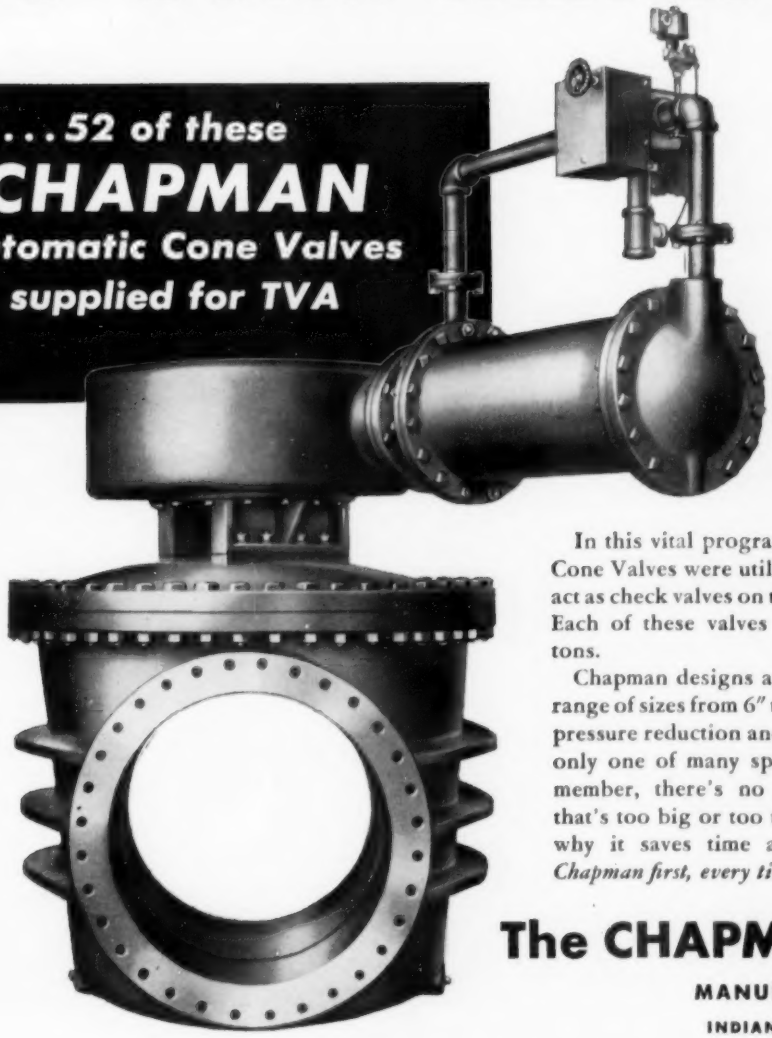
DEAD END

SIGNALS AHEAD



36" CONE VALVES *with clear* OPENING

...52 of these
CHAPMAN
Automatic Cone Valves supplied for TVA



To supplement its hydro-electric power, TVA has built a series of steam plants on the Tennessee and Ohio rivers. These new units will furnish power required for Atomic Energy and other projects.

In this vital program, 52 Chapman Automatic Cone Valves were utilized for these plants . . . to act as check valves on the condenser water pumps. Each of these valves weighs approximately 11 tons.

Chapman designs and builds these valves in a range of sizes from 6" to 48" for check, throttling, pressure reduction and stop valve service. This is only one of many special Chapman valves. Remember, there's no problem in flow control that's too big or too tough for Chapman. That's why it saves time and money to *check with Chapman first, every time.*

The CHAPMAN VALVE
MANUFACTURING COMPANY
INDIAN ORCHARD, MASSACHUSETTS

Get full details of this month's products . . . mail your Readers' Service card today.

To order these helpful booklets check the coupon on page 32.

Get This Helpful Data On Valve Boxes

187. Full details on service, roadway and valve boxes, meter boxes, frames and covers are included in Bulletin 2000 issued by Alabama Pipe Co., Anniston, Ala. All standard sizes are listed, together with prices, and instructions are furnished for handling special designs. Check the coupon for your free copy.

Engineering Data on Tilting Disc Check Valves

196. The Chapman tilting disc check valve is designed to lift away from the body seat without sliding or wearing; closes without slamming. Operating principles, details of construction, dimensions, recommendations and engineering data are fully covered in 18-page Bulletin No. 30. Get your copy by checking the coupon or write to Chapman Valve Mfg. Co., Indian Orchard, Mass.

What You Should Know About The Centriline Process

197. The Centriline method for cement mortar lining water mains 16" thru 144" in place to stop leaks, prevent corrosion, increase carrying capacity and decrease pumping costs is fully described in a handsome booklet issued by the Centriline Corp., 140 Cedar St., New York 6, N. Y. Many illustrations and typical case histories show the operation and economies of this process. The Tate process for lining smaller mains is also covered. Check coupon for your copy.

Complete Catalog and Reference Data on Valves and Fittings

211. The entire M & H line of valves, fittings and accessories for water works, filtration, sewage disposal and fire protection are illustrated and fully detailed in Catalog 52 issued by M & H Valve & Fittings Co., Anniston, Ala. In addition to complete data on these products, there are many pages devoted to helpful engineering data. Every designer should have a copy. Get yours by checking the coupon.

Helpful Valve Catalog For Engineers

236. For complete descriptions of Darling double disc, parallel seat gate valves be sure to get Bulletin 5002 issued by Darling Valve & Mfg. Co., Williamsport, Pa. Construction details covering all valve parts and accessories are helpful for specification writers. Check the coupon for your copy.

Efficient Underdrains for Rapid Sand Filters

239. Be sure you have engineering data on vitrified clay underdrains, efficiently designed for filtering and backwashing. Check the coupon or write F. B. Leopold Co., Inc., Dept. PW, 2413 W. Carlson St., Pittsburgh 4, Pa.

Manual Covers All Types Of Pipe and Service Repairs

266. Full details on the entire line of Skinner-Seal pipe repair clamps, service fittings and drilling equipment are presented in a new catalog and service manual offered by the M. B. Skinner Co., South Bend, Ind. Step-by-step installation pictures and captions give clear, concise instructions for the repair of all types of pipe leaks. Get helpful Catalog GW by checking the coupon.

Standard Specifications for C. I. Pipe and Fittings

278. Standard dimensions for cast iron water pipe and special castings are available in a convenient booklet offered with the compliments of U. S. Pipe and Foundry Co., Birmingham 2, Ala. Get your copy by checking the coupon.

New Advantages In Boiler Construction

309. Get the latest data on cost-saving tube-supported wall enclosures for large and small boilers from Bigelow-Liptak Corp., 2550 W. Grand Ave., Detroit 8, Mich. 12-page booklet gives full details. Check the coupon today.

Trencher Fits Municipal Needs

315. A bulletin describing the Cleveland Model 95 trencher has been published by the Cleveland Trencher Co., Cleveland 17, Ohio. The Model 95, called "The standard machine for city and suburban work", is versatile, maneuverable and economical for use on water lines, service lines, road widening and all utilities trenching. Get this 8-page illustrated bulletin by checking the coupon.

Helpful Data on Water Meters

330. It is to the interest of every water works superintendent and engineer to have full data on dependable Badger water meters and related meter products. Complete data on all types of disc, turbine and compound meters, meter test equipment, yokes, strainers and alarm registers are supplied in an attractive binder by Badger Meter Mfg. Co., Milwaukee 45, Wis. Check the coupon for your copy.

Engineering Data on Equipment for Municipal Water Conditioning

347. For information on the design and operation of many types of water treatment plant equipment, including the Graver Reactivator, pressure filters, iron removal installations, zeolite softening and water conditioning for swimming pools get Bulletin WC-113 from Graver Water Conditioning Co., 216 West 14th St., New York 11, N. Y. Check the coupon.

Factors to Consider in Elevated Tank Selection

299. Details on the several different types of elevated steel tanks, including capacity ranges, tank dimensions and other factors to be considered in the selection of elevated tanks for modern water storage, plus discussions of new tanks for old towers and foundations are included in Bulletin 101 of the Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. Check coupon for your copy.

KOEHRING MUD-JACK® raised sunken slabs at city bus terminal (above) . . . stabilized sub-grade support under the paved parking area without interrupting traffic. Small holes were drilled through the pavement . . . then, Mud-Jack pumped inexpensive soil-cement slurry into the holes, raised the concrete, leaving solid, permanent support. Compact, portable as a 2-wheel cart, this No. 10 Mud-Jack is ideal for city work . . . no inconvenience to the public, no detours necessary. Also check the bigger No. 50 Mud-Jack for preventive maintenance and repairs on extensive highway work. Saves time, money and labor.

Send for 20-page engineering hand-book on Mud-Jack method of stabilizing sub-grades.

TO: KOEHRING COMPANY, Milwaukee 16, Wis.
NAME
STREET
CITY STATE

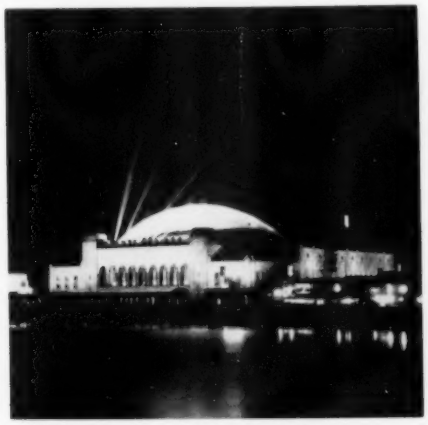
Made of Grade A Bronze and Grey Iron castings. Precision-machined to give decades of dependability. Thoroughly tested before shipment. Unexcelled for low-cost, all-weather service. Distributed by Plumbing & Heating Wholesalers.

Write for Catalog and Prices

THE MURDOCK MFG. & SUP CO CINCINNATI 2, OHIO

OTHER MURDOCK PRODUCTS:
- HYDRANTS
- STREET WASHERS
- FOUNTAINS
- SHOWERS
- VALVES

1954
PUBLIC WORKS CONGRESS & EQUIPMENT SHOW
ATLANTIC CITY, N.J. SEPT. 19-22



MUNICIPAL AUDITORIUM

BOARDWALK

new ideas . . . new techniques . . . new equipment

PANEL DISCUSSIONS

"Financing Urban Street Improvements"

"Construction and Engineering Contracts"

FORUMS

"Refuse Disposal"

"Off-Street Parking"

"Sewage Disposal"

PAPERS

"Public Works and the National Economy"

"Equipment Replacement Policies"

"Testing Performance in Public Works Operations"

QUESTION TABLE DISCUSSIONS

Incineration of Refuse; Subdivision Standards & Controls; Traffic Control; Street Repair & Maintenance; Equipment Management; Soil Cement Streets, Operating and Cost Records; Street Lighting; Work Safety Programs; Regulating Street Uses; Design and Construction of Sewers; Refuse Collection Practices; Airports; Water Supply & Distribution; Public Relations; Sanitary Landfills; Design & Construction of Bituminous Streets;

All requests for Hotel reservations must be sent to the

Atlantic City Housing Bureau
16 Central Pier, Atlantic City, N. J.

AMERICAN PUBLIC WORKS ASSOCIATION

1313 East 60th Street, Chicago 37, Illinois

Thousands use our Readers' Service card to keep up to date . . . do you?

To order these helpful booklets check the coupon on page 32.

All About Centrifugal Pumps

361. Where pumping performance counts you want to check your specifications carefully. Investigate the features of Fairbanks-Morse centrifugals. Use coupon or write to Fairbanks, Morse & Co., Dept. P. W., Chicago 5, Ill.

How Your Filter Washing Can Be Improved

368. More effective sand washing with elimination of mud balls and bed cracking with resultant longer filter runs are claimed for the Palmer Filter Bed Agitator, described in bulletins issued by Palmer Filter Equipment Co., Erie, Pa. Get latest data by checking the coupon.

●

CIVIL DEFENSE

Get the Facts on Air Raid Sirens

86. There's more to be considered in air raid warning sirens than the loudness of the signal. Get complete information on efficient size and spacing of sirens from Federal Sign and Signal Corp., 8733 So. State St., Chicago, Ill., by using coupon.

Does Your Water Works Have Standby Power?

224. Dependable Climax power plants are ready for emergency service to insure fire protection, and can also save power costs by peak load operation. Use the coupon for full data on Climax, 40 to 495 HP, operating on sewage or natural gas, butane or gasoline. Climax Engine & Pump Mfg. Co., So. La Salle St., Chicago 5, Ill.

Do You Have An Independent Source of Electricity?

27. An independent source of electricity which will supply power for vital services when regular sources fail can be invaluable during emergencies. Check Kohler Bulletin KEP-31 which furnishes data that will help you select the plant best suited for your needs. Many models, 500 watt to 30 Kw, portable and stationary, are described. Write the Kohler Co., Kohler, Wis., or use the coupon.

●

TRAFFIC SIGNS

How Electro-Matic Controllers Solve Problem of Congested Intersections

60. Traffic control system regulated by Electro-Matic Controllers continually adjust to changing traffic patterns to clear traffic faster and relieve the problem of congested intersections. Be sure to investigate this method of expediting traffic flow at difficult intersections. Get full data from Automatic Signal Div., Eastern Industries, Inc., East Norwalk, Conn. Just check the handy coupon.

How Reflective Sheeting Improves Traffic Signs

157. Get full data on Grotelite reflective sheeting for smooth, brilliant, long-life traffic signs and marking devices from the Grote Mfg. Co., Bellevue, Ky. Use the handy card or coupon today.

Safe-T-Cones Solve Traffic Problems Night and Day

222. For data on Safe-T-Cones, the all-rubber traffic guides available in two sizes, 18" and 28"—painted or reflectorized for day and nighttime use—get bulletin from Radiator Specialty Co., Charlotte, N. C. Information included on Safe-T-Signs which add greatly to value of markers. Check the coupon now!

"Quick-Set" Posts for Signs and Snow Fence

333. For quick, easy driving in any type of soil, be sure to check Buffalo Steel "Quick-Set" sign posts, available in any length you need and ready-punched for fast installation of signs and snow fence. Get full data from Buffalo Steel Div., H. K. Porter Co., Inc., Tonawanda, N. Y. Just check the coupon.

Get This Helpful Sign Manual

367. Detailed information on all classifications of National Standard Signs for control of traffic, street identification and other purposes, together with a complete line of accessories is presented in a convenient Sign Manual by Lyle Signs, Inc., 2720 University Ave., S.E., Minneapolis 14, Minn. For a copy, check the coupon.

●

STREET LIGHTING

Investigate These Street Lighting Standards

366. You can get complete data on Kerrigan factory-built "Weldforged" street lighting standards by using the handy coupon. Check these strong, well designed, yet inexpensive steel standards for practical street and highway lighting. Handsome folder also includes data sheets on floodlighting and area lighting standards. Kerrigan Iron Works, 1033 Herman St., Nashville, Tenn.

The NEW IMPROVED **NETCO** CATCH BASIN CLEANER WITH PNEUMATIC CONTROLS

A Necessity For Every Municipality

Easily mounted on any short wheel base truck with 8 ft. in back of the cab, the Netco can be operated continuously, averaging 20 to 30 catch basins a day. The Netco with its two powerful pneumatic buckets (orange peel or clamshell) is simple to operate, has a hoisting capacity up to 1500 lbs., and easily removes all debris through openings as small as 16 inches. *Send for our six-page descriptive folder.*

NETCO DIVISION
CLARK-WILCOX COMPANY
118 Western Avenue
Boston 34, Massachusetts

PALMER

FILTER BED AGITATORS

TECHNICAL ADVANTAGES

- 1—Requires an average of 40% less wash water
- 2—Completely eliminates mud balls
- 3—Eliminates cracking or shrinking of the beds
- 4—Produces "new" filter media after short period of normal operation
- 5—Turns out purer, better tasting water
- 6—Low installation cost
- 7—Low operating cost
- 8—More water through the filters
- 9—Less "time out" washing filters

PALMER

ANTHRAFILT FILTER MEDIA

FAR SUPERIOR to Sand or Quartz Media, as it Doubles length of Filter runs, nearly halves wash water needs; with less coating, caking, or balling.

Filters are in service more as wash water cycle shorter. Better removal of bacteria, taste, odor. Increased Filter output, better effluent. Ideal for industrial acid and Alkaline solutions. Ask any user.

PALMER FILTER EQUIPMENT CO.
822 E. 8th St. • Erie, Pa.

IT WORKS WONDERS IN RUBBISH COLLECTION-

300 to 400% increase in efficiency

75% decrease in handling costs

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers . . . All Designs . . . All Sizes

With the Dempster-Dumpster System, one truck-mounted Dempster-Dumpster accomplishes more than several conventional dump trucks. You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good housekeeping with this Dempster-Dumpster System—the lowest cost method of municipal bulk trash and rubbish collection ever devised.

It's like having one truck with scores of bodies. One truck-mounted Dempster-Dumpster serves scores of detachable containers built in capacities up to 15 cu. yds. Each is designed to meet your requirements. You simply place these containers at convenient trash and rubbish accumulation points outside or inside buildings at hotels, schools, hospitals, business establishments (drug stores, grocery stores, restaurants, etc.), market, housing and apartment areas, etc. As each is loaded, it is picked up on pre-arranged schedule . . . hauled and dumped. Entire operation is handled by hydraulic controls in cab by only one man, the driver.

The list of cost-minded municipalities using the Dempster-Dumpster System includes Asheville, N. C., Atlanta, Lexington, Ky., Baltimore, Birmingham, Boston, Cincinnati, Wyandotte, Mich., Denver, Norfolk, Pensacola, Fla., Richmond, New Orleans and many, many others. Write to us now for complete information. Manufactured exclusively by Dempster Brothers, Inc.

Representatives in principal cities throughout the United States, Canada and foreign countries. There's one near by to serve you promptly.

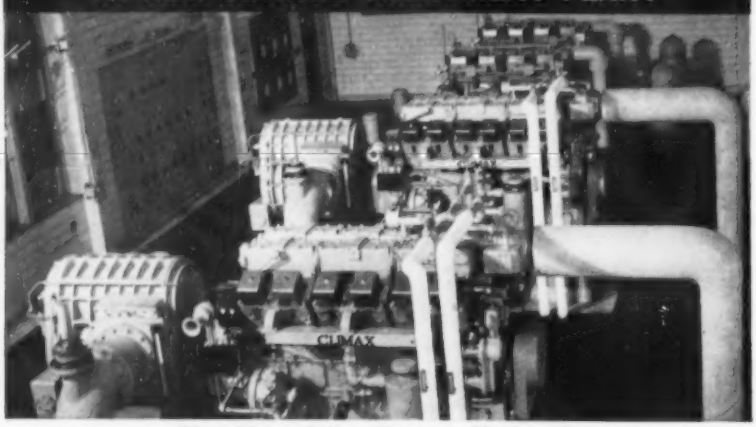
DEMPSTER BROTHERS, 984 Dempster Bldg., Knoxville 17, Tennessee

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

To order these helpful booklets check the coupon on page 32.

climax BLUE STREAK ENGINES

IN NEW SEWAGE TREATMENT PLANT



The New Joint Benton Harbor–St. Joseph, Mich. Sewage Treatment Plant designed to serve an equivalent population of 75,000 is in full operation.

A novel feature is that it is of the split activated treatment type with provision for 8 MGD primary and 4 MGD secondary flow. The sewage pumps are driven by two 100 H.P., 720 RPM, 8 cylinder, Climax sewage gas engines having automatic speed control which can vary the pumping capacity from 1½ to 12 MGD.

Two 4100 CFM blowers are driven by 160 H.P., 720 RPM, 12 cylinder, Climax sewage gas engines equipped with governors having manual control for speed variation.

Climax engines were selected because of their known economy, dependability and flexibility.

This treatment plant was designed by and built under the supervision of Consoer, Townsend & Associates, Engineers.

climax

FOR COMPLETE INFORMATION, WRITE TO . . .

ENGINE AND PUMP MFG. CO.

208 So. La Salle St.

CHICAGO 4, ILLINOIS

Factory–Clinton, Ia. *District Office*–Dallas, Tex.

WHY BUY SEWER CLEANING EQUIPMENT

- We will lend you equipment to maintain your sewers, at a charge generally less than the cost of your equipment upkeep.
- A completely equipped sewer department at your disposal, when you want it, with no equipment or supervisional problems.
- It is economical, and good business, to eliminate sewer trouble, by preventive cleaning.

Thomas Drain Service

Home Office - 35 S. College St., Akron 8, Ohio

Collect Phone Calls Accepted

Call Blackstone 2212 Akron, Ohio

Get full details of this month's products . . . mail your Readers' Service card today.

REFUSE COLLECTION AND DISPOSAL

Sanitary Landfill Operation and Methods

28. The location and area requirements for sanitary landfill, operation methods for trench type and area fills, equipment selection and costs are items discussed in an 8-page booklet issued by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Be sure you have this reference when considering the problem of garbage and refuse disposal. Check the handy coupon today.

How to Reduce Refuse Collection Costs

123. The sequence of operations for fast loading and refuse compaction in the Gar Wood Load-Packer are illustrated and described in 12-page folder W-110, together with size data and details of hydraulic elements. Be sure to check all details of the efficient Load-Packer system. Check coupon or write Gar Wood Industries, Wayne Division, Wayne, Mich.

Increasing the Efficiency of Bulk Rubbish Collection

177. Strategically spotted bulk containers can be handled by one man operating a Dempster-Dumpster equipped truck. Get full details of this cost-saving system of rubbish collection, as used by many cities to increase efficiency and eliminate unsanitary conditions. Write Dempster Brothers, Inc., 952 Dempster Bldg., Knoxville 17, Tenn., or use the handy coupon.

Efficient Landfill Operations For Small Communities

349. Step-by-step photos and concise text are used in a bulletin of the Oliver Corp., to show the construction and operation of a sanitary landfill, using equipment especially suitable for the smaller community, the Oliver OC-3 Tractor-Loader. Besides providing economical refuse disposal, many other jobs handled by this unit are suggested. For a copy, write to the Oliver Corp., 400 W. Madison St., Chicago 6, Ill. or check the coupon.

What You Should Know About Refuse Incinerators

362. Two helpful bulletins tell what you should know about low cost refuse incineration for the small community and for larger cities. Your questions on mechanical stoking, burning rates and operating problems are discussed. Get Bulletins 217 and 223 from Nichols Engineering & Research Corp., 70 Pine St., New York 5, N. Y. Just check the coupon.

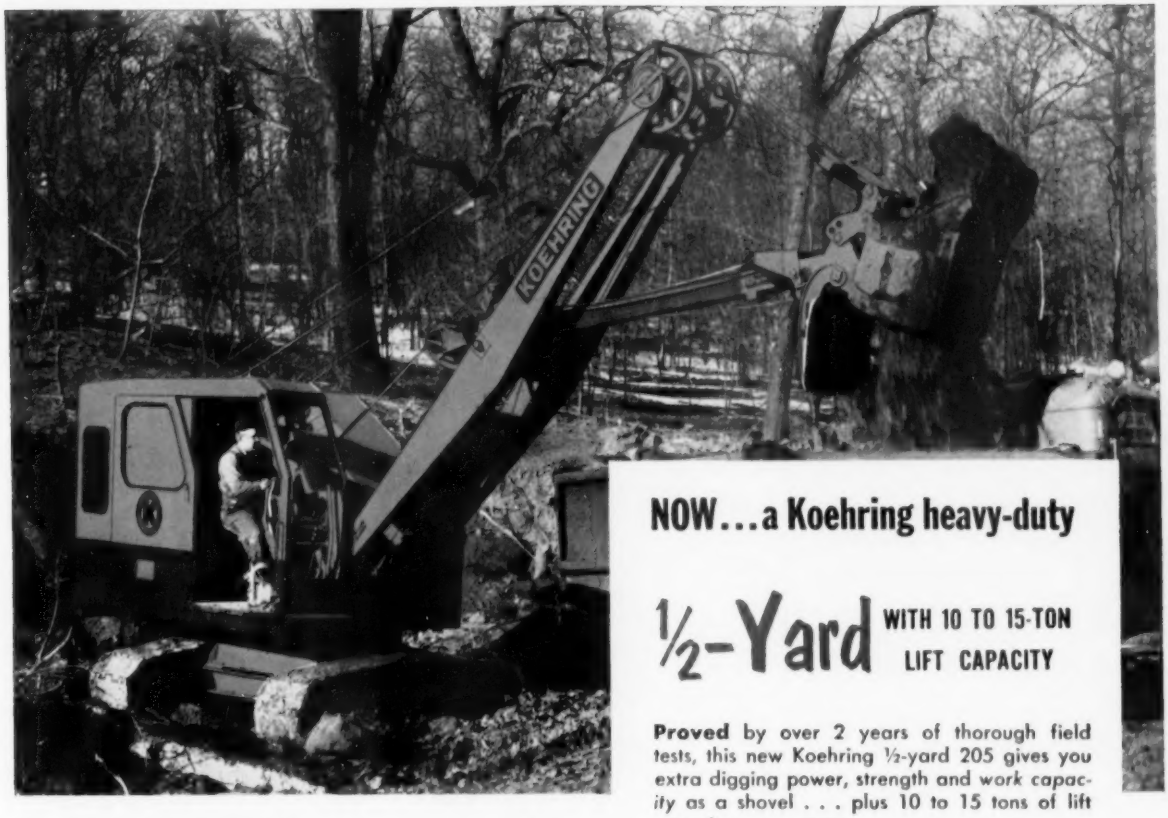
WEED CONTROL

What You Should Know About Chemical Weed Control

132. In a convenient 44-page book, the C. B. Dolge Co. gives full details on spraying procedures and chemicals to use for control of lawn and roadside weeds, ragweed eradication and insect control in turf. Get your copy by checking the coupon or write C. B. Dolge Co., Westport, Conn.

How to Simplify Your Weed Spraying Operations

293. Chemical spraying for weed control is made simpler and easier by the Tarrant "Direct from the Drum" sprayer, a compact power spraying unit which will handle dozens of jobs. Get full data from Tarrant Mfg. Co., 27 Jumel St., Saratoga Springs, N. Y. Check the coupon.



NOW...a Koehring heavy-duty

½-Yard WITH 10 TO 15-TON LIFT CAPACITY

Proved by over 2 years of thorough field tests, this new Koehring ½-yard 205 gives you extra digging power, strength and work capacity as a shovel . . . plus 10 to 15 tons of lift capacity as a crane.

16-foot box-section shovel boom, with 12-foot, 2-inch dipper stick mounted at deep mid-section of boom, provides plenty of strength for heavy-duty digging.

Full cable crowd at 85 feet per minute, retract speeds of 133 feet per minute, and electric controlled push-button dipper trip, maintain fast dig-and-dump cycles.

Big 20-inch clutch on crowd, 18-inch swing clutch, 14-inch clutch on boom-hoist and retract, are all self-adjusting.

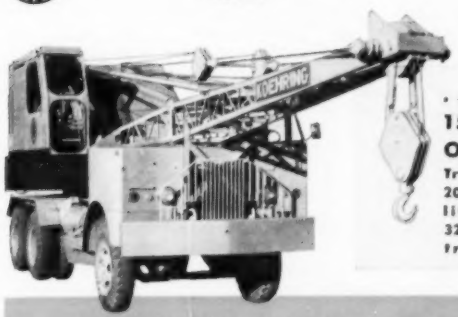
Carburized, hardened gears, splined shafts, and antifriction power flow on dig, swing and travel, assure smooth, dependable operation under maximum loads.

Only 2 major shafts in upper machinery . . . fewer parts, easier maintenance. Each shaft assembly is an independent unit.

Automatic traction brakes simplify operation. This important safety feature locks, holds 205 when working or parked.

Standard or extra-long crawlers on the Koehring 205 take 16, 20 or 24-inch shoes.

WITH ½-YARD HOE
205 digs 17¾ feet below crawlers. Also available as clamshell or dragline; handles ½ to ¾-yard buckets on wide work range. Lifts up to 10 tons as a crawler crane.



. . . LIFTS 15 TONS ON RUBBER
Truck-mounted 205 has 15-ton lift capacity, 32½ m. p. h. travel speeds.

Before you invest in any excavator or crane, be sure to see your Koehring distributor about this new 205. Call him today, or write →

KOEHRING COMPANY

Subsidiaries: KWIK-MIX • PARSONS • JOHNSON

K446

- To: KOEHRING COMPANY, Milwaukee 16, Wisconsin
- *Send us bulletin on new ½-yard, 15-ton 205.*
- NAME _____ TITLE _____
- DIVISION _____
- STREET _____
- CITY _____ STATE _____

PW

SOIL COMPACTION
For Better, Quicker STREET REPAIRS

Use BARCO RAMMERS

HERE is a BETTER, QUICKER, CHEAPER way to repair streets when holes or trenches are dug in paved areas. Instead of (1) mounding up the backfill and waiting for it to settle, or (2) using expensive granular replacement fill, do as others are now doing – Use Barco Rammers to get HIGH DEGREE COMPACTION of original backfill *immediately*. No waiting to restore paving! No dangerous bumps or holes left in streets! No expensive "call backs" to work on holes! SAVE WITH BARCO!

ASK FOR DEMONSTRATION

The Barco Rammer is a new tool with many uses! Tamps backfill to 95% compaction at amazingly low cost — Let us show you actual figures. Ask for our nearest distributor to give you a demonstration.

• Send for CATALOG No. 621

BARCO MANUFACTURING COMPANY
556J Hough St.
Barrington, Ill.
(A Chicago Suburb)
Builders of Portable Gasoline HAMMERS and RAMMERS

UP FRONT FOR ADEQUATE ROADS

BY
LEO J. RITTER, JR.

Back to School—Over 300 persons were in attendance at the Annual School for Town Highway Superintendents, which was held on the campus of Cornell University late in June. We had a small part in the proceedings, and thoroughly enjoyed it. This is a real working program—three days of closely scheduled instructional sessions covering topics of particular interest to the group. Subjects varied all the way from planning the new town garage to design and construction of low cost roads and streets. One whole session was devoted to gravel roads and bituminous surface treatments. The school is quite informal, contrasting sharply with some highway conferences in that stress is placed upon practical problems of vital concern to the people attending. I don't believe there was a single mention of toll roads or superhighways. Talks were of an unusually high caliber for this type of meeting, with many of the speakers making very effective use of slides and other visual aids. Incidentally, included in the program were six training films of the Department of the Army, which cover the construction of military roads and are very well done. The school is under the direction of Jim Spencer of the Department of Agricultural Engineering at Cornell, who is doing a swell job with it.

English Literature — Along with many engineers, this writer has never had too much interest in English literature. However, the New York Times recently came up with some quotes from one William Shakespeare (didn't he used to play halfback at Notre Dame?), which are applicable to the present traffic situation. Among them were the following:

"I do not without danger walk these streets"—Twelfth Night

"Stir not until the signal"—Julius Caesar

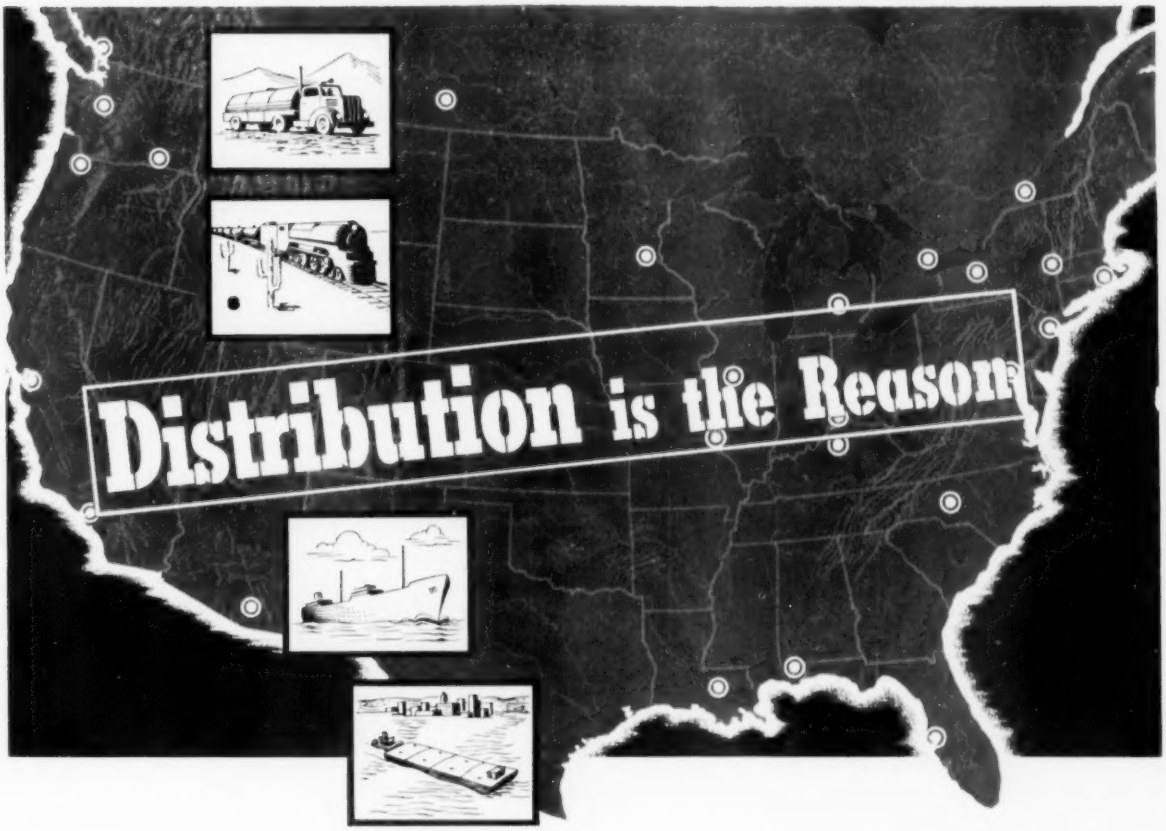
"If we may pass, we will"—Henry V

"Horns do make one mad"—Merry Wives of Windsor

"O mistress, mistress, shift and save thyself"—The Comedy of Errors

Do Trucks Pay Their Fair Share of Highway Taxes? — As you know, that is a $64 question, one which we can't answer. However, interesting figures relative to the truckers' share of state highway users' taxes are included in a report presented in *Public Roads* for June of this year. The study showed that trucks and truck combinations contributed nearly one-third of the more than 3 billion dollars paid by all vehicles in 1952. All trucks, except panel, pickup, and other light trucks, accounted for 6 per cent of total registrations, 10 per cent of the total traffic, and contributed 24 per cent of the total highway user taxes collected by the states. The heaviest group of vehicles (tractor semi-trailers and truck trailers) represented only one per cent of total registrations, yet contributed 12 per cent of taxes. Facts supporting the old argument that we have used for years appear in the report, in that passenger cars and light trucks average about one-half cent per mile in highway user taxes. Thus, if Mr. Average Owner drives his car 10,000 miles in a year, he pays only $50 per year in direct taxes for the use of the highway system. On the average, this is much less than the cost of the issurance on his car. The average owner's cost of ownership and operation will, on today's market, be more than 8 cents per mile. Thus, less than one-tenth of his cost goes in direct highway user taxes to provide the highway system, without which his car would be useless. And yet, in many states, we can't seem to convince people that increased highway user taxes are necessary, logical, and fair. In-

BITUMULS® Gains in Nationwide Acceptance



FROM COAST-TO-COAST throughout this country, an ever-increasing number of Roadbuilders are specifying Bitumuls for all types of surfacing. These men specify Bitumuls for two good reasons:

1 They know that they can get Bitumuls *when and where they need it,* in the quantity and grade required.

2. They can depend on uniform high quality asphalt emulsions when they specify Bitumuls.

Back of this ready availability of Bitumuls is a system of distribution that is without parallel in the industry. From our many refineries and plants, Bitumuls moves in steady stream — by truck, rail, boat, or by barge — to local storage-points across the nation. Here it is held in readiness for immediate job-delivery or for pick-up by the Roadbuilder.

National distribution is, of course, only one of the reasons why more surfacing is being done with Bitumuls. Cold-applied emulsified asphalt in this modern, convenient form offers important savings in time, labor and equipment. New illustrated booklets, available on request, give full technical information and methods of application. Write for your copies today.

AMERICAN Bitumuls & Asphalt COMPANY

200 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA

E. Providence 14, R. I. Perth Amboy, N. J. Baltimore 3, Md. Mobile, Ala.
Columbus 15, Ohio Tucson, Ariz. Seattle, Wash. Baton Rouge 2, La.
St. Louis 17, Mo. Inglewood, Calif. Oakland 1, Calif. Portland 7, Ore.
Washington 5, D. C. San Juan 23, P. R.

Now's the time to mail this month's Readers' Service card.

BROS tip sheet

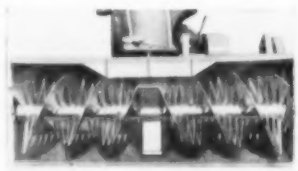
EQUIPMENT NEWS FROM A FAMOUS NAME IN ROAD MACHINERY

POWERFUL NEW TRACTOR-MOUNTED ROTARY FOR "SMALL BUDGET" SNOW REMOVAL

In the fall, detach the bucket from the hydraulic front-end loader. Attach the Series "A" plow and engine unit. In the spring, just remove this unit and re-attach the bucket, leaving your tractor loader free for summer work.

Imagine a powerful rotary snow plow costing less than one good shoveler's pay for six months! This Bros Series "A" Sno-Flyr does the work of dozens of hand shovelers at a fraction of the cost. And you can reckon your removal time in minutes and hours instead of days! If you want fast snow removal but cannot justify larger truck rotaries, this Series "A" is for you!

Two special casting chute attachments are available for the Series "A" Sno-Flyr. A segmented "finger-joint" chute capper permits you to adjust height of snow stream, just like crooking your finger. A longer loading chute is also available for truck hauling work. The Series "A" is offered in three plowing widths—4'4", 5'6" and 6'6".



Terrific Series "A" performance is due largely to the slit-spiral rotor's unique slots which "knife" through hard-packed snow, handling it easily.

This "A" Rotary features the famous Bros 180° revolving ball-bearing casting chute with cab-mounted hand control.

THIS LOW-COST PLOW NOW AVAILABLE FOR JEEPS

This year Bros is also offering an adaptation of the Series "A" which mounts on 4-wheel drive Jeeps. This model of the Sno-Flyr Rotary is an ideal width (6'6") for most custom-plowing work. Makes a blade-plow Jeep a tool of yesterday.

"Quickies" for your information

Bros also makes the world-famous line of Series "M" Sno-Flyr Rotaries for large 4-wheel drive trucks, motor graders and crawler tractors.

●

Also new from Bros last year were two new smaller self-powered Sno-Flyr Rotaries, Series "SA", 21" and 26" plowing widths.

●

Early spring of 1954 Bros delivered the largest railroad rotary ever built. Moral: if you want to plow snow, call Bros!

Road Machinery Division... **WM. BROS BOILER AND MFG. CO.**

1183 10th Ave. S.E., Minneapolis 14, Minnesota

To get specifications and data on any of the Bros snow removal products listed below, just check the items which interest you and send us this slip, along with your name, company or organization and postal address.

- ☐ Series "A" Sno-Flyr Rotaries for tractor loaders
- ☐ Series "SA" self-powered Sno-Flyr Rotaries, 21" and 26"
- ☐ Series "A" Sno-Flyr Rotaries for Jeeps
- ☐ Series "M" Sno-Flyr Rotaries for 4-wheel drive trucks
- ☐ Bros blade-type push plows
- ☐ Series "M" Sno-Flyr Rotaries for motor graders
- ☐ Series "M" Sno-Flyr Rotaries for crawler tractors

It's a fact... our handy Readers' Service card is the way to get new catalogs.

incidentally, the five previous sentences are *not* contained in the report, which is a workmanlike job by Edwin Cope, John Lynch, and C. A. Steele, all of the BPR organization in Washington.

1954—Year to Build — That's the message of the U. S. Chamber of Commerce publication, *Construction Markets*, recently issued. The publication asserts that purchasers of construction will get more for their money now than in any year since the war. This is a good year for construction, because of stability in costs, competition among bidders, willing labor, stable flow of materials, availability of "cheap" money for construction financing, and tax advantages now being considered by the federal Congress. Although investors may be tempted to wait for an even more favorable situation, the group points out that waiting is a "long-odds" gamble. Good advice. It has been a long time since the buyer of construction has been able to find any measure of relief from uncertain scheduling and rising costs.

A Wonderful Guy — John A. Long, formerly managing director of the County and Municipal Divisions of ARBA and of the Florida Road Builders' Association, passed away early in June. His death is mourned by his many friends in the highway industry. Honest, sincere, friendly, and capable, his passing leaves a gap in the lives of those who counted him a personal friend.

This and That — "Make no little plans . . ."; they aren't, at least in the Philadelphia area, where a 25-year, billion-dollar program of highway improvements has been recommended by the Technical Advisory Committee on Highways of the Greater Philadelphia-Delaware-South Jersey Council. If you have driven the West Side Highway in Manhattan lately, you will have noticed a spectacular new display—an illuminated, fiber glass and plastic, tractor-trailer truck, twice as big as life and just as natural—which adorns the top of the new terminal of the Yale Transport Corporation. Something else new—the floating exhibit, mounted on a barge, prepared by the New York Trap Rock Co. to dramatize the highway story; it will be open to the public at various places in the east in the coming year. Highway affairs in Florida are headed for better (and more stable) times, with the victory of Leroy Collins in the

FLAG DAY?

June 14th was more than Flag Day, it was EVALUATION DAY for CD Warning systems.

Were you one of the few municipalities who found their systems completely adequate?

No one can be severely criticised for deficiencies that showed up in the Flag Day tests. A complete warning system, like Rome, cannot be built in a day. Criticism will be leveled at you from all angles if you have not evaluated those test results and taken steps to correct the deficiencies.

Your time limit for the 'real thing' is not known; you cannot justify further postponement. Each passing day brings you closer to the time when you *must* act, when your system *must* function with 100% coverage. Call on FEDERAL for assistance with your CD warning system.

FEDERAL
SIGN and SIGNAL CORPORATION

Formerly: Federal Enterprises, Inc.

8733 SOUTH STATE STREET CHICAGO 19, ILLINOIS

Need more facts about advertised products? Mail your Readers' Service card now.

Catch Basins

CAN NOW BE CLEANED RAPIDLY AND INEXPENSIVELY WITH THE

Pippin

EXCAVATOR

LOWER COST + INCREASED SPEED = GREATER SAVINGS

The Catch Basin Attachment for the PIPPIN Excavator fills a long recognized need for a fast, inexpensive method for cleaning catch basins, which will not tie up a large investment in single-purpose equipment that is to be used only occasionally.

This attachment mounts on a standard PIPPIN Excavator. Maximum efficiency is achieved through complete hydraulic control. With the dipper stick of the Excavator fastened in position, the dipper stick cylinder is now used to operate the cable and sheave mechanism which rapidly lowers the orange peel bucket to a maximum depth of 19½ feet into the catch basin. The bucket, opened and closed by a double acting cylinder, is easily filled and raised to 9 feet above ground for loading directly into a truck.

Mounting or dismounting this attachment is a simple operation, requiring only an hour or so. This means that this versatile Excavator can be kept in continuous use on a wide variety of jobs.

The Most Versatile Piece of Equipment Your Money Can Buy

1. Backhoes 10 ft. deep
2. Backfills
3. Cleans Catch Basins
4. Holds Rock Drill
5. Installs Culverts
6. Digs Drainage
7. Grades Roadsides
8. Cleans Ditches
9. Shovels
10. Loads 12 ft. High
11. Digs Graves
12. Lifts Heavy Pipe

Write For Complete Information

PIPPIN CONSTRUCTION EQUIPMENT, INC.

White River Junction, Vermont

Need more facts about advertised products? Mail your Readers' Service card now.

gubernatorial primary. A 117-mile section of the New York Thruway, between Utica and West Henrietta (south of Rochester) was formally dedicated on June 24.

Gravel Sources — We were much interested in the discussion of methods of finding new gravel sources, which was one of the topics at the Cornell school for highway superintendents. In New York state, and in others as well, known sources of gravel are being depleted rapidly. This is forcing many local governmental agencies to look for new gravel sources close to home. Don Lueder of Cornell's Aerial Photographic Center discussed this problem in some detail, stressing the use of soil survey (agricultural) maps and reports, geologic maps and reports, and aerial photographs. Aerial photographs, examined in stereoscopic pairs, are most valuable for this use, but require some understanding of the basic processes of soil fermentation and geology in order to be able to identify probable gravel sources with some degree of accuracy. The amount of knowledge required is not great, nor is it too difficult to acquire. Land forms associated with the presence of sand and gravel include river bars and banks, river terraces, kames, eskers, and sand dunes. If you're interested, write a line and we'll send you a list of some sources of information on the subject. One of the better ones is a military publication, TM 5-545, Geology and Its Military Applications, published by the Department of the Army in 1952.

About People — R. J. Paquette, Professor of Civil Engineering at Georgia Tech, is spending the summer in St. Paul, working with the Automotive Safety Foundation on the Minnesota Highway Needs Study. T. C. Kavanagh, Chairman of Civil Engineering at NYU, has resigned to devote full time to his partnership with Capt. Emil Prager in NYC; they have the Cleveland subway job, incidentally.

• • •

Chemistry is Getting More Complicated

Population of the human race isn't the only thing zooming. The Atom Family now numbers 1,277—each of the 100 elements having several isotopes. And the particles that make up each atom now exceed 24, most of them residing inside the atomic nucleus.—*The Fisher Scientific Co. "Laboratory."*

Don't Let "WINTER PARALYSIS" Cripple Your Town!

Prevent it with BAUGHMAN

. . . the SAFE name in Ice-Control Equipment

- **Complete Line of Pull-Type or Truck-Mounted Spreaders.**
- **Hydraulic, Mechanical or Traction Powered.**
- **For Sand, Cinders, Salt, Chips, Calcium Chloride, Gravel.**

Ask for a demonstration . . . call your BAUGHMAN distributor

THE NEW HYDRAULIC *"SPREAD MOBILE"*

- *Exclusive new "Center-Spred" Design—spreads material under all four wheels for better operator visibility, perfect traction.*
- *Operator can control direction of spread (left, right, or center) as well as amount and width of spread.*
- *Hydraulically Controlled from Cab with one man operation.*
- *Exhaust Heater to prevent load freezing.*
- *Split-Bottom Dump for off-season dump-body uses.*
- *Heavy-Duty Auxiliary Gas Engine for hydraulic system.*

ICE CONTROL DISTRIBUTORS

Connecticut, Hartford — Holmes-Talcott Co.
Delaware, Milford — B. V. Wharton
Illinois, Chicago — C. C. Fuller Co.
Illinois, East St. Louis — Transportation Equip. Co.
Illinois, Jerse/vi'le — Baughman Serv. & Equip. Co.
Illinois, Moline — Moline Body Co.
Indiana, Indianapolis — Allied Truck Equip. Corp.
Iowa, Des Moines — Hawkeye Truck Equip. Co.
Ma'ne, South Portland — N. A. Burkitt, Inc.
Massachusetts, Cambridge — Sandberg Equip. Co.
Michigan, Bark River — Bark River Culvert & Equip. Co.
Michigan, Rockford — Burch Body Works
Michigan, Lansing — Truck & Trailer Equip. Sales Co.
Michigan, Saginaw — Scientific Brake & Equip. Co.
Minnesota, Minneapolis — Ruffridge-Johnson Equip. Co.
Missouri, Chillicothe — Cooke Sales & Serv., Inc.
New York, Buffalo — T. E. Potts Equip. Co.
New York, Groton — Highway Materials Co.
New York, Pelham Manor — Tyler-Preusser, Inc.
New York, Rensselaer — Van's Equip. Sales, Inc.
North Caro'ina, Char'otte — Twin-States Equip. Co.
North Carolina, Raleigh — Twin-States Equip. Co.
Ohio, Canfield — Myers Equip. Corp.
Ohio, Cleveland — Ohio Truck Equip. Co.
Pennsylvania, Harrisburg — F. W. D. Truck & Equip. Co.
Tennessee, Memphis — Scruggs Equip. Co.
Vermont, Montpe'ier — Vermont Road Equip. Co.
Wisconsin, Milwaukee — Hunter Tractor & Mach. Co.

BAUGHMAN MANUFACTURING COMPANY

225 Arch St. • Jerseyville, Illinois

Thousands use our Readers' Service card to keep up to date . . . do you?

Look to LEOPOLD
for the finest in
Water Purification
and Sewage Plant
Equipment

Glazed Tile
FILTER BOTTOMS

Permanent • No corrosion or tuberculation • Equal distribution • Low loss of head • Requires only small sized gravel • No metal in contact with water!

Write today for details

F. B. LEOPOLD CO., INC.
2413 W. Carson Street, Pittsburgh 4, Pa.

the search
for
PURE WATER
354 B. C.
"Hippocrates' sleeve" (a cloth straining bag) was a popular water treatment method in the 4th Century B. C.
For excellence in MODERN water treatment equipment
—gravity and pressure filters—recirculation apparatus...
MECHANICAL EQUIPMENT BY ROBERTS FILTER MFG. CO. DARBY, PENNA.

ROBERTS FILTER
MANUFACTURING CO.
640 COLUMBIA AVVE., DARBY, PA.

People, Ideas and Events

BY "DOC" SYMONS

H.T.M.A. — And now is the time to reminisce a bit about the AWWA meeting in Seattle. In a short space, how can I do justice to a wonderful trip, a record breaking convention, and many grand and wonderful people.

★ ★ ★

Last month, I mentioned the trip out to Seattle and the detour around the flood. I didn't mention: The several delightful cocktail parties held aboard the Empire Builder of the Great Northern Railway; the attractive Ranch Car for sandwiches and drinks; the excellent train meals and service at reasonable prices (Eastern Railroads, please note); the desolate landscape of much of Montana through which we rode all day; the Rocky Mountains, the Cascade Mountains, our first view of Puget Sound and the Olympic Mountains; our arrival at Seattle, famed city of the Pacific Northwest.

★ ★ ★

With a few hurried "See you laters", our train load of 85 water works-ers dispersed to various hotels about the city. On that same day, another AWWA tour train arrived from the long sightseers' journey from the east. So successful was that trip that the 82 persons aboard presented a beautiful wrist watch to E. A. Sigworth, who "handled" his last AWWA Special and retired as Chairman of the Transportation Committee at the end of the trip. "Siggie" was succeeded by Lou Frazza of Transite Pipe.

★ ★ ★

First of the many convention festivities was the Sunday evening buffet supper (Potlatch, they called it), for which 525 reservations had been made and at which they fed 768 persons. Monday evening saw the presentation of the Awards followed by dancing and some room-hopping. Klondike night which came on Tuesday evening, was all gaiety, gambling, and geniality. The gambling was strictly for fun, the gaiety was provided by costumes both gorgeous and ghastly; the geniality was provided by the host committee. Reg Hayes (Hydraulic Development Co.) won the man's best costume prize as an Eskimo and pretty Mrs. Robert Park (U.S. Pipe) of Seattle won the ladies' prize as a dance hall girl.

Ray Faust (AWWA Exec. Asst. Secy.) said that he and the other male prize judge did *not* pick the lady winner—I don't blame them; there were half a dozen other pretty ladies in dance hall and other costumes between whom I couldn't have made a choice. Fred Merryfield, Prof. of San. Engr., Univ. of Oregon, would certainly have got a prize if there'd been more than one. His portrayal of the tramp character of Charlie Chaplin's silent movie days was superb.

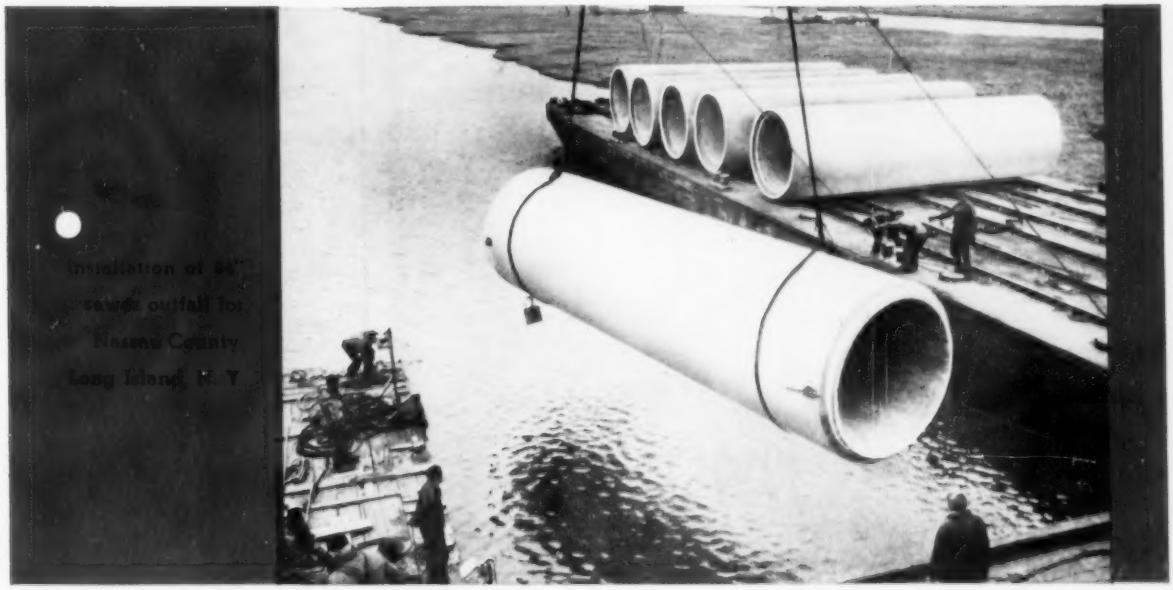
Wednesday night—the starlight cruise on Lake Washington and Puget Sound was so popular that they had to provide three boats to handle the crowd of 425 who turned out for a delightful boat trip; 'twas an evening long to be remembered.

★ ★ ★

Thursday night is banquet and dance night at all AWWA Conventions. At this affair the Spanish Ballroom of the Olympic Hotel was resplendent and crowded with conventioneers and their wives. This meeting attracted more wives (527) by far than had ever attended before. When you realize that less than 40 per cent of the registration (2063) could get into this dining hall, you wonder what all those other people did on Thursday night. Probably went to El Gauchos, Rossellini's, etc., etc., etc., for some wonderful food.

LOCK JOINT

for efficient and easy subaqueous installation



Ideal for water intakes, sewer outfalls and river crossings, Lock Joint Reinforced Concrete Subaqueous Pipe provides the simplest, most effective method of joining pipe under water. The self-centering Rubber and Steel joint can be drawn together accurately and easily by merely taking up the nuts on two draw bolts of a special joint harness. Once the joint has been pulled "home," the compressed rubber gasket seals a permanent, watertight, flexible joint which requires no further bolting, caulking or welding.

Added advantages of Lock Joint pipe are the absence of tuberculation or corrosion, long life, permanent high carrying capacity and minimum maintenance costs. If your pressure pipe project requires pipe 16" in diameter or larger, you owe it to yourself to investigate the unexcelled characteristics offered by Lock Joint.

One of the leading producers of sewer and culvert pipe, Lock Joint Pipe Co. also manufactures pressure pipe for:

- TRANSMISSION MAINS
- INDUSTRIAL INSTALLATIONS (Supply, circulating and cooling systems)
- DISTRIBUTION MAINS
- WATER WORKS OPERATIONS (Pumping and treatment plant piping)
- SEWER WORKS OPERATIONS (Force mains and treatment plant piping)

LOCK JOINT PIPE COMPANY

Established 1905

P. O. Box 269, East Orange, N. J.

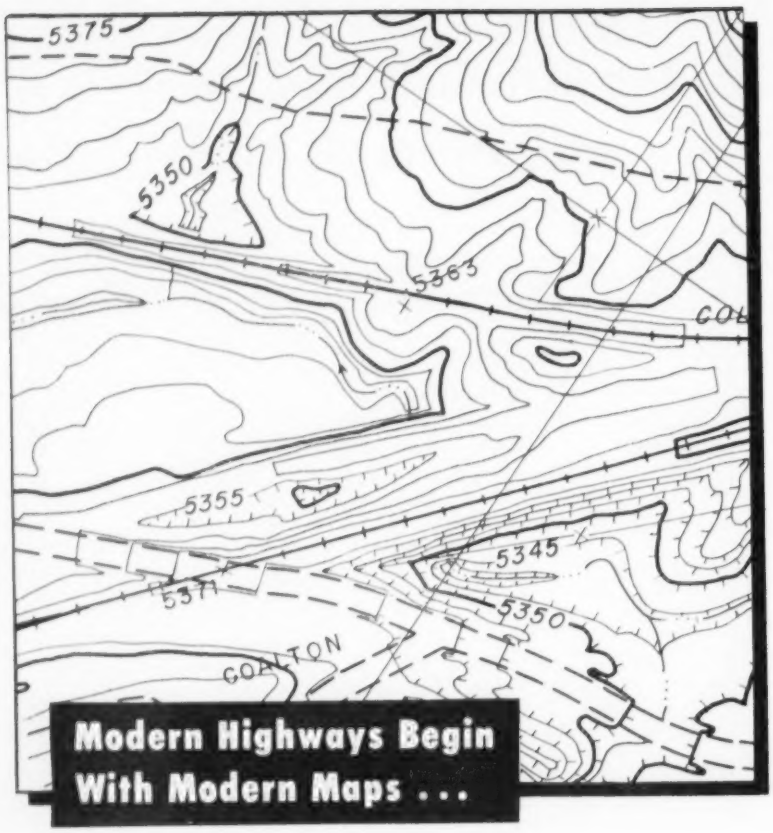
PRESSURE PIPE PLANTS: Wharton, N. J., Turner, Kan., Detroit, Mich., Columbia, S. C.

SEWER & CULVERT PIPE PLANTS:

Casper, Wyo. • Cheyenne, Wyo. • Denver, Col. • Kansas City, Mo. • Kennett Square, Pa. Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. • Wichita, Kan. • Kenilworth, N. J. Hartford, Conn. • North Haven, Conn. • Tucumcari, N. Mex. • Oklahoma City, Okla. • Tulsa, Okla. • Beloit, Wis. • Hato Rey, P. R. • Ponce, P. R. • Caracas, Venezuela • Wholly Owned Subsidiary, Great Lakes Pipe Co., Plants: Buffalo, N. Y. • W. Henrietta, N. Y.

LOCK JOINT *Reinforced Concrete* PRESSURE PIPE

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.



Modern Highways Begin With Modern Maps . . .

Post-war automobile production has put more vehicles on our highways than they were ever designed to handle. More and new types of highways are vitally needed now. Freeways, turnpikes and toll roads are being planned to shorten the distances, reduce grades and reduce travel time.

Topographic maps produced by Jack Ammann photogrammetric methods— have been produced— or are now being produced for the following:

- **Denver-Boulder Turnpike**
- **West Virginia Turnpike**
- **Kansas Turnpike**
- **Dallas-San Antonio Turnpike**
- **Dallas-Ft. Worth Turnpike**
- **Highway Departments of Vermont, Massachusetts, New York, Connecticut, Rhode Island, New Jersey, Kansas, Texas, California, Washington and Oregon.**

To meet this immediate need, highway officials and consulting engineers have turned to the services of Jack Ammann Photogrammetric Engineers. With Jack Ammann photogrammetry work can be speeded — costs can be cut—just as the highway projects listed have found.

Consult us on your mapping needs. Put our nearly a quarter-of-a-century of mapping experience to work.

Jack Ammann
PHOTOGRAMMETRIC ENGINEERS, INC
BROADWAY AT TENTH SAN ANTONIO 5, TEXAS
AIR SURVEYS—MAPS

EASTERN OFFICE: Manhasset, N. Y., 32 Hillcrest, P. O. Box 411, Phone Manhasset 7-1840
WESTERN OFFICE: (Denver) Lakewood, Colo., 995 Flower St., Phone Bel. 3-2090

Get full details of this month's products . . . mail your Readers' Service card today.

★ ★ ★

Heard a lot of speeches at Seattle. Among the best was Harry Jordan's acknowledgement of the creation, by WSWMA, of the Harry E. Jordan Scholarship Award for college students in water supply.

Another important speech was the new president's inaugural address by Dale Maffitt, Gen. Mgr., Water Dept., Des Moines, Iowa. Dale pointed to several needs of the water works industry, to wit: young competent engineers, good wages, better pension systems, higher rates, more good public relations, and a committee on research. Dale also said that water works men should look to consulting engineers to help solve problems and should recognize equipment manufacturers as a source of help.

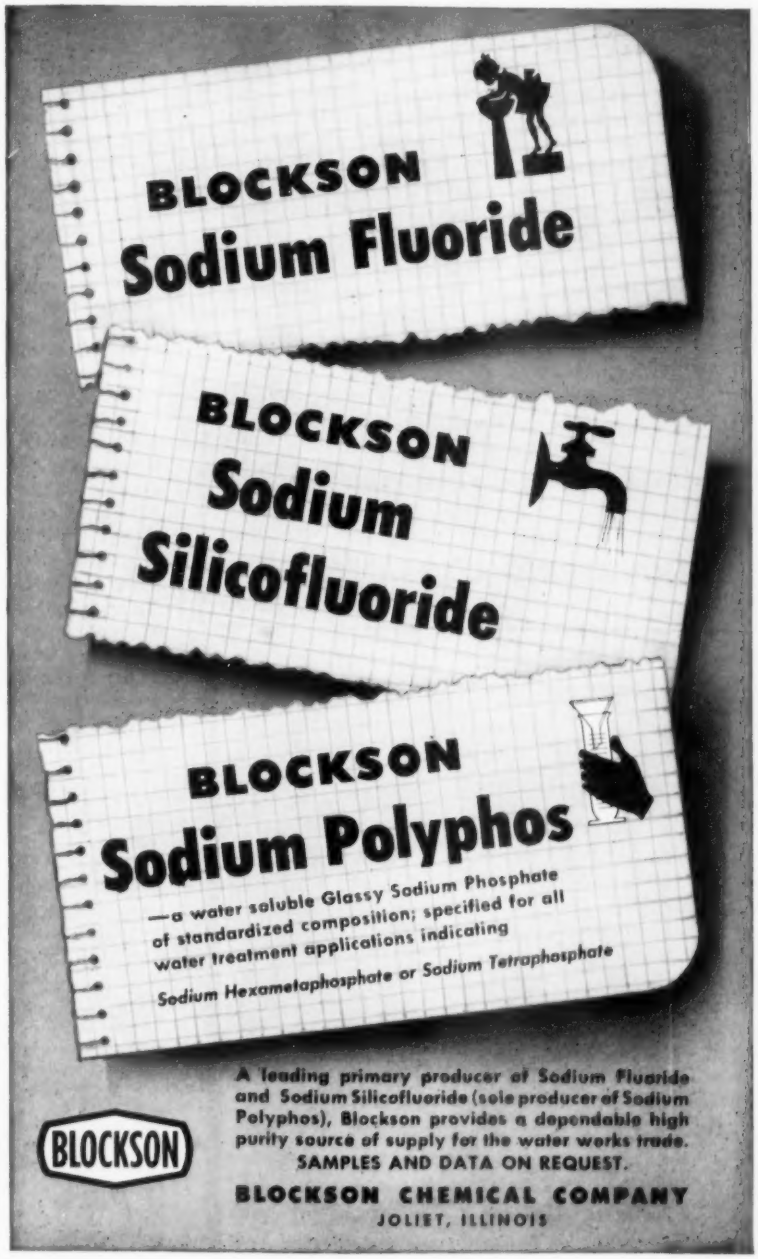
At the WSWMA lunch, Pres. "Steve" Rankin, (Dorr Co.) presented a few statistics on the past year's operations.—There are now 186 members and last year at six conventions, 265 exhibits were presented for the benefit of 5644 conventioneers. Club Room entertainment was provided at 21 local or state meetings, for 4061 guests of which 1364 were manufacturers' representatives. (That means that for every mfrs. rep. there were almost two customers—Ought to be more.)

★ ★ ★

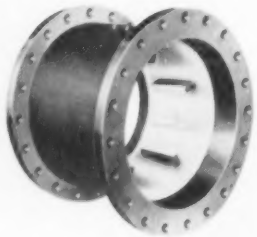
Society of Council Bluffers — Once again, came the end of the Annual AWWA dance and the Society of Council Bluffers gathered for their yearly meeting. This "grand group" of which I'm permanent secretary, consists of that hardy band of pioneers who trekked to the 1947 AWWA Convention in San Francisco in a private railroad car. Two years later the group was formalized with three grades of membership: Members, Associate Members, and Half-Associate Members (appropriately abbreviated). Members (12) are those actually making the trip; Associate Members are wives (4) who didn't make the trip; and H. A. members are six persons who should have gone with us.

★ ★ ★

Among those absent at Seattle, were Byron Brock of State College, Pa., and his wife who were spending a week's vacation in Hawaii—lucky people. Also absent and not so lucky were Sam Newkirk of Elizabeth, N. J., and Len Thompson, of St. Paul, Minn. Sam was ill and


BLOCKSON
Sodium Fluoride
BLOCKSON
Sodium
Silicofluoride
BLOCKSON
Sodium Polyphos
—a water soluble Glassy Sodium Phosphate of standardized composition; specified for all water treatment applications indicating
Sodium Hexametaphosphate or Sodium Tetraphosphate
A leading primary producer of Sodium Fluoride and Sodium Silicofluoride (sole producer of Sodium Polyphos), Blockson provides a dependable high purity source of supply for the water works trade.
SAMPLES AND DATA ON REQUEST.
BLOCKSON
BLOCKSON CHEMICAL COMPANY
JOLIET, ILLINOIS

Flow Tubes—For Accuracy in Metering



The Flow Tube is an impact-type head meter designed for accurate measurement and regulation of fluid flow. It consists, essentially, of a short spool piece, the inner periphery of which is equipped with two groups of pressure nozzles, one group pointing upstream and the other downstream. The nozzle groups are inter-connected by common pressure rings from which connections are made to the high and low pressure sides respectively, of a conventional indicating, recording or integrating meter. Flow Tubes differ from other variable head meters in that the taps are located at points of equal cross-sectional area. Therefore, the differential developed is a function of the velocity head and independent of the static head.

Flow Tubes are compact, comparatively light weight, relatively low in cost, and are easy to install since they require straight runs entering and following only when installed near throttling valves or regulators. And, Flow Tubes are available in types and D/d ratios to provide differentials that can be accurately measured with the least head loss.

Flow Tubes are furnished with head capacity curves based on laboratory tests. These data furnished with each Flow Tube makes our guarantee of exceptional metering accuracy possible.

For further information, write us, and for specific recommendations, send us necessary flow data.

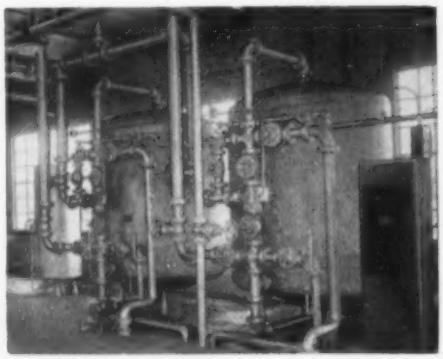
FOSTER ENGINEERING COMPANY

835 LEHIGH AVE. **UNION, N. J.**

Got a Hard-Water Problem?

LAKESIDE

IS THE ANSWER



Lakeside uses different kinds of zeolites and accessories to meet your particular needs in a softener. Such care insures high capacity, minimal cost, long life and ease of operation. Bulletin 78 tells you a great deal about zeolite softening, including the capacities of the various zeolites, how to determine the amount of zeolite required and how to compute the dimensions for any softening unit.

Sectional drawings show the details of construction of the softeners, and full data are presented on manual, semi-automatic and fully automatic control.

Send for Bulletin 78 now if you have a hard water problem.

LAKESIDE ENGINEERING CORP. 222 West Adams Street Chicago 6, Ill.

Thousands use our Readers' Service card to keep up to date . . . do you?

Len's wife was ill. Both Sam and Len were scheduled to receive Honorary Membership Awards.

★ ★ ★

Friday morning saw many "tourists" take off for all-day trips to Bremerton or Victoria, B. C., or on a long trek to Alaska. Friday pm saw more tourists leave for various other points of interest and Saturday the long AWWA Tour back started out on a visit to some beautiful spots. Those of us with less time departed from the Milwaukee Station about 3 pm Friday afternoon. There were about 30 of us on the train.

The mountains—the Cascades, the Summits, the Bitter Roots, the Big Belts—were beautiful but everything wasn't perfect on the trip home. Car 162 had the air conditioning go bad and No. 1610 ran out of water about every three hours. Didn't get either fixed until we arrived in Milwaukee, just 85 minutes away from the train's destination—Chicago. Charlie Coleman (DeLaval Pump) lost his baggage in Seattle, Mrs. Sigworth and Mrs. Russ Vollmer (Baltimore) had terrible colds. When we arrived in Chicago, one and a half hours late, a station guard threw us in a "tizzy" by saying that the Broadway Limited (on which most of us had reservations) wasn't scheduled to go (It was May 30) actually the time table was wrong—it didn't run on the 31st. Even though the train did run, Car 292 was taken off and many of us were shifted to other cars, while our red caps tried to locate us. — Nothing more untoward happened and next morning I was home again.

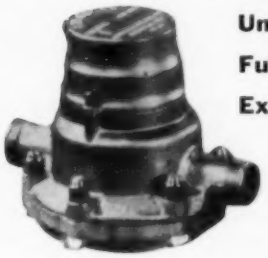
★ ★ ★

News Notes from Brushy Bend — West Short Water Producers Association held a meeting in Racine, Wis., May 5—Secy. is George Prindle, Highland Park, Ill., Chairman, Harry Draves, Michigan City, Ind. —May 26th—Perrysburg, Ohio—N.W. Ohio Section meeting. Burton Ames was host. . . . The 11th Spring Meeting of the Central Section of the Illinois Water Plant Operators was held on June 16 at Tuscola, Ill. Lloyd Alton and Clyde Humes of Ill. Cities Water Co. were hosts. . . . Long Island Water Conference held its regular meeting on June 28 at Westbury, Long Island, N.Y. Otto Laux of Franklin Square, L.I., is Chairman.

V.T.Y.—Doc Symons

"I bought American Meters for these four reasons!"

"I thought all water meters were about alike until I took an American Meter apart, and found it had



Simplest design
Unsurpassed accuracy
Fully interchangeable parts
Exceptional performance records

These features together with the competitive price sold me on the spot. Now we're buying American."

Ask for complete literature.

BUFFALO METER CO.

2920 Main Street • Buffalo 14, New York

Now's the time to mail this month's Readers' Service card.

NEW SEWERAGE COSTS ARE GOING UP BUT...

WITH BERMICO®

LIFETIME PIPE

YOUR FIRST COST IS YOUR LAST COST!

Where new construction is needed for growing communities and subdivisions Bermico Sewer Pipe is your best buy—because it's built to last a lifetime. Yet you can't buy a lower-cost root-proof pipe installed.

Made of tough wood fibre impregnated with pitch, Bermico is root-proof, corrosion-proof, installs faster and easier.

Install Bermico—best in low-cost root-proof pipe for sewer lines and drainage. For detailed facts, specifications and name of nearest dealer write Dept. EB-8, our Boston office.

All required fittings available

BROWN COMPANY, Berlin, New Hampshire
CORPORATION, La Tuque, Quebec

SOLKA AND CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS • NIBROC TOWELS • NIBROC KOWTOWLS NIBROC TOILET TISSUE • BERMICO SEWER PIPE AND CONDUIT • ONCO INSOLES • CHEMICALS

General Sales Offices: 150 Causeway Street, Boston 14, Mass.—Dominion Square Building, Montreal, Quebec

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

For Better Ice and Snow Control Next Winter...

A PLAN OF ACTION

NOW!

ORDER YOUR STERLING ROCK SALT EARLY AND PLAN ITS DISTRIBUTION TO STRATEGIC STORAGE POINTS

Salt Storage NOW is the Key to Storm Strategy LATER!

THE BIG COST VARIABLE in your budget is for man-hours of crews and equipment. If, under emergency conditions, they must haul salt cross-town or cross-country to get it to where it's needed—your costs go up.

Sterling Rock Salt . . . ordered now . . . and distributed to your key pick-up points in advance . . . avoids costly waste motion of crews when the storms come. Your men and machines are a striking force . . . not a supply train.

And don't worry about storage losses, either. The free booklet, offered below, shows many ways Sterling Rock Salt can be stored easily, safely and economically . . . indoors or outdoors . . . without loss.

Avoid Last-Minute Confusion! Save Money!

ORDER YOUR STERLING AUGER-ACTION ROCK SALT NOW!

INTERNATIONAL SALT COMPANY, INC.
Scranton, Pennsylvania
SALES OFFICES:
Atlanta, Ga. • Chicago, Ill. • New Orleans, La. • Baltimore, Md. • Boston, Mass. Detroit, Mich. • St. Louis, Mo. • Newark, N. J. • Buffalo, N. Y. • New York, N. Y. Cincinnati, O. • Cleveland, O. • Philadelphia, Pa. • Pittsburgh, Pa. • Richmond, Va.

Save money by using trucks and crews in slack periods during the next month or so to place Sterling Rock Salt under protective covering at key locations . . . *where* you want it *when* you'll need it.

When storms hit, streets and roads are cleared promptly. No last minute confusion. No duplication of effort—or of costs in transporting and handling rock salt. It's already there, where it's needed—according to *plan!*

Send for FREE Booklet,
"HOW TO PROVIDE LOW-COST ROCK SALT STORAGE"
11 ways to store safely, economically— indoors or outdoors.

Get full details of this month's products . . . mail your Readers' Service card today.

Are you ready for next winter's snow?

Jefferson County, Colorado, uses CAT* No. 12 with Domor snow blower to keep 250 miles of roads clear

Between Denver and the Rockies there's a high plateau where the wind really blows in the drifts. Important highways west of Denver run through Jefferson County, and they offer a big snow clearance problem.

The Caterpillar No. 12 Motor Grader shown in action with a Domor snow blower attachment is one of four such machines owned by District 1. Working in second gear, it can clear both sides of a three-mile stretch of road in an hour. Harry Ross, road superintendent, says: "I've operated graders for ten years and I still like the Cat Motor Grader the best of any make."

The Domor blower is built to work with the No. 12, matching its power and rugged construction. It throws snow right off the highway and into the fields. But whether V-plow, snow wing or blower is used, more counties depend on the big yellow machines for this tough job than on any other grader.

The biggest reason is that Caterpillar Motor Graders save money for the taxpayers. They stay at work year after year. 99% of all of them ever built are still on the job! Economical on fuel, simple and easy to maintain, they are built throughout by one responsible manufacturer—serviced by one reliable source.

Your Caterpillar Dealer has motor graders and attachments in three sizes—and facts and figures to show which is *your* best buy. Get his advice today.

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

● SNOW in New Hampshire and how sodium chloride acts to clear the traveled way and make driving safe after plows have removed the heavier falls.

LeROY F. JOHNSON
Maintenance Engineer
State Highway Department

25 YEARS OF WINTER MAINTENANCE in New Hampshire

THIS State enacted legislation 29 years ago which authorized the State Highway Commissioner, with the approval of the Governor and Council when the public good required, to designate certain sections of the Trunk Line Highways for snow removal. Because there was considerable difference of opinion as to the possibility or desirability of such a program, it was placed on a voluntary basis in the beginning. This practice did not permit the continuous travel desired since many of the towns did not participate and consequently many sections of the Trunk Line Roads were not plowed. So after two years the voluntary practice was abandoned and the Commissioner designated the routes to be plowed.

In general the State reimbursed the towns and cities for one-half the cost of this work, but for a few years the State limited its share to a maximum of thirty-five dollars per mile. The equipment used was town, city or privately owned trucks and tractors with plows of every description known at the time. Some plows were made of wood and some of steel; most of them were of the "V" type, copied in design generally from those used by the railroads.

In the beginning it was inconceivable to consider plowing until after the storm was over, but equipped as everyone was with tire chains travel was not as hazardous as it would appear to be today. The volume of traffic and the driving speeds were much less than now which no doubt explains why the fatal accidents were so few during this period.

One requirement stipulated in the 1925 snow removal legislation stated that "The Highway Commissioner shall cause the snow to be ploughed on sections, suitable for motor vehicle traffic, leaving at least four inches of snow on the road". The Department's Engineers in charge of snow removal were trying to get the pavements as completely cleared as possible and were constantly being berated by persons who were using horse drawn vehicles when a layer of four inches of snow was not left on the pavement.

Traffic would make ruts in the snow during a thawing period and when cold weather returned the ruts would become crusted with ice. This made driving difficult because the rear wheels of a vehicle would climb the sides of the ruts first on one side and then on the other causing the operator to lose control of his steering and frequently result in having the front wheels in one set of ruts while the rear wheels were in another. No one would consider driving a motor vehicle during the early years of this snow removal program unless they had tire chains, a shovel and an axe with them.

The practice of spreading abrasives at first was frowned upon, but in 1928 hills, curves, railroad crossings and intersections were being sanded. When the State assumed all of the cost of maintenance in 1933, chloride treated sand was spread continuously along our highways whenever they were covered with ice or compacted snow.

Many of the Department's Engineers, principally those who had been exposed to railroad practices, knew that only large tractor plows could ever be expected to keep our roads open during winter months, but today tractor plows are seen only on town highways where excessive grades and narrow cut sections exist.

Perfection in 1938

By 1938 perfection in winter maintenance had been achieved, so we thought at the time. Various sizes of trucks and plows were properly located; adequate trucks with department built sand spreaders and sufficient manpower to operate them were available twenty-four hours a day, when needed. We also had men in cars patrolling our highways between 8:00 pm. and 5:00

am. It was the duty of these men to observe weather changes and highway conditions and, when the occasion necessitated, to call the patrolman in charge of the section which required work to be done. This night patrol was instituted to permit the regular road patrolmen and their crews of men to sleep at night knowing that if a snow or freezing rain storm came or that abrasives needed to be spread in some locations, there was someone who would call them before conditions were dangerous for travel. There were 36 of these night men, with cars equipped with a blue light, for the entire State. One of their duties was to provide courteous assistance to the traveling public, and because of the many instances when their aid prevented serious mishaps they were deignated the "Blue Angels" by those they had assisted, and soon thereafter the newspapers gave publicity to the "Blue Angels" and their duties. Now we operate a night patrol of seventeen radio equipped "Blue Angel" units on the highways and our radio equipped Division Offices are manned twenty-four hours each day during the winter months. This readily furnishes us with the information necessary properly to care for our winter highways.

The mileage of State highways maintained during the winters increased each year until in the 1940-41 winter it was 2,900. This required spreading nearly 175,000 cubic yards of sand which had previously been treated with about 2,300 tons of either calcium or sodium chloride to prevent it from freezing in the stock piles. The complete cost of sanding this mileage was just over $562,000, which was slightly more than 20 percent of the total annual funds expended for all maintenance costs on the State Highway System of 3,540 miles. The total cost of winter maintenance for this same winter was approximately $884,000. It was interesting to compare these figures with those for the 1925-26 winter when the cost for plowing snow on 620 miles of State highways was about $38,000.

The practice of sanding surfaces covered with ice and frozen compacted snow was at most a makeshift operation. It did not provide the surface traction needed for vehicles whose speeds were increasing yearly, while more and more of them were using the highways. With the ever-increasing mileage of State highways, city streets and town roads which were being sanded more and more heavily each year, the supply of sand in many locations became nearly exhausted, and consequently more expensive to obtain. For this reason, we in New Hampshire looked for a more satisfactory and less expensive means of providing safe traveling conditions on our highways during the winter months.

To provide pavements free of ice or frozen compacted snow was our problem. Believing this could be solved, we began to experiment in February, 1941, with both calcium and sodium chlorides, separately and combined in various proportions. From the results of these experiments, we developed a method of ice prevention through the use of sodium chloride which proved successful.

● **PUTTING salt on the road with a Tarco Scotchman salt spreader.**

● **THIS is the kind of road that used to be closed after a heavy snowfall. Now a plow goes through and salt is applied to permit safe and full use of the road.**

Chloride Use To-Day

It is now our practice on a two-lane road to spread sodium chloride for a width of about two feet along the center of the pavement when storms are of such a nature that snow compacts under traffic and adheres to the pavement, also during freezing rains or immediately following plowing operations if snow still remains on the pavement.

Highways carrying large volumes of traffic are treated as soon as possible, if it appears that snow will compact and adhere to the pavement. If it does not, and traffic movement tends to blow it from the pavement, no chloride is spread. Otherwise, sodium chloride of the coarse commercial size is spread at the beginning of a storm to prevent the snow from compacting and adhering to the pavement. Consequently it permits the plows more effectively to keep the pavement clean during the storm. If the storm is of sufficient duration to dissolve all of the chloride, additional applications are made and usually at the conclusion of the storm there are some short sections of pavement which require additional treatment.

Highways carrying light traffic should be treated after plowing. It is extremely desirable to spread the chloride as soon as the storm is over and the pavement has been plowed, provided compacted snow covers the pavement, because at the conclusion of these storms the temperature usually remains at about 20°F for a short time. This period is generally of sufficient length to permit traffic to break up the snow mat and move it off the pavement. The melting action of the chloride is must faster when the temperature is 20°F or above than at lower temperatures. Consequently to obtain the quickest and most effective pavement clearance, advantage

should be taken of this higher temperature.

An application of 300 to 600 pounds of sodium chloride per mile of two-lane pavement is usually adequate for the average storm. Every effort should be made in plowing snow to prevent an accumulation of matted snow to remain along the center of the pavement. If the center of the pavement can be cleared of snow quickly by the chloride it will provide reasonably safe travelling conditions at speeds which will expedite the clearing of the remaining portions of the pavement. Frequently it is desirable on excessive grades and locations where the pavement clearing is found to be slower than average, to use slightly more chloride. Chlorides should not be used as a substitute for plowing unless the storm deposits less than two inches of snow.

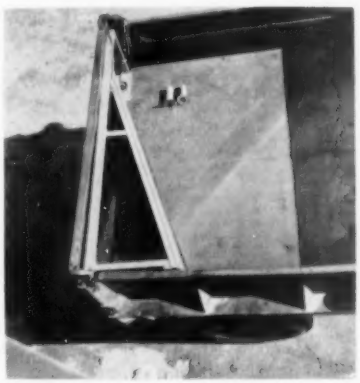
Generally, winter storms are followed by clear cold weather with temperatures below the accepted point when sodium chloride is supposedly effective, but if the sun's rays shine on the area of the pavement where some packed snow still remains, the clearing action will continue, consequently chloride should be spread on these areas early on the clear days to take full advantage of the few hours when the sun's rays will aid the chloride in clearing the matted snow.

Sleet and Ice Storms

Freezing rains and sleet storms require the chloride to spread as soon as ice appears on the pavement. Generally one application of 300 to 400 pounds per mile, applied to the middle third of a two-lane pavement, will suffice to dissolve existing ice and provide a bare pavement when the storms have passed. This practice will permit emergency use of the highways by motor vehicles traveling at reasonable speeds during these storms with some degree of safety. Occasionally the temperature will fluctuate above and below freezing during one of these storms, and generally when the temperature rises above the freezing point, rain will fall more rapidly—thereby dissolving and removing from the pavement all of the chloride and making it necessary to repeat the application when the temperature drops below the freezing point and ice again begins to form.

During the winter a combined sleet and rain storm may leave as much as an inch or more of ice on the pavement and following the storm a rapid drop in the temperature to zero or lower produces a condition which requires that calcium chloride be used together with sodium chloride to dissolve the ice blanket. From 100 to 200 pounds of calcium chloride with 300 to 600 pounds of sodium chloride have been used successfully in clearing ice under these conditions.

● **BAG salt dispenser permits application of salt as needed.**



● **FOR bulk salt spreading, a tail gate dispenser can be used.**

● **ROPE control device gives quick shut-off of discharge pipe.**

Occasionally after snow or freezing rain storms when the sodium chloride has not completely cleared the pavements and a few ice patches remain, if the temperature is such that sodium chloride alone is not effective, it should be combined with calcium chloride as described for sleet storms.

We use various methods for spreading the chlorides. The following types were developed by two of our patrolmen:

One type of dispenser used when the application is desired to be concentrated along the centerline is a funnel-shaped metal hopper with a 1½-inch pipe telescoped into a 2-inch pipe extending to a flared plate set about 9 inches from the road surface. The hopper has two metal straps which hook over the truck tail gate or side of the truck to hold it in position. The pipe extending to the flare plate is telescoped to permit the use of this unit on trucks of varying body heights.

Another type is for use with bulk sodium chloride. It is a wooden frame set in the truck body from which a 2½-inch pipe extends. A rope controlled flapper at the bottom of this discharge pipe permits the operator to spread the chloride as desired. Two inserts, one with 1½ and the other with a 2-inch opening may be placed in the top of the discharge pipe to control the quantity spread. We also use Tarco "Scotchman" motor-driven mechanical dispensers which may be adjusted to spread the chloride for any desired width.

We now winter-maintain 3,200 miles of our State Highway System at an average yearly cost of approximately $2,000,000. Of this total, sanding accounts for 13 percent ($260,000), direct application of chlorides 41 percent ($820,000), plowing and snow fence 43 percent ($860,000), and night weather patrol 3 percent ($60,000).

What advances will be made during the next quarter of a century to improve winter driving conditions further it is difficult to forecast, but Wilhelm Rademacher, a German engineer claims he has a solution which can be mixed with bitumens, and that pavements constructed using this mixture become snow and ice free. Reports of experimental work done in Germany and New Brunswick are as yet not too encouraging, but let us all pray that this or some other more simple and less expensive method than the ones we are now practicing is developed.

Getting Water and Sewerage

● **WATER softening plant in Edmonton, Alberta, must withstand low temperatures.**

WINTER comes to water and sewage treatment plants and to water and sewer systems just as it does to highways and streets. The fact that not much attention is normally given to getting these facilities "ready for winter" is a testimonial to the good design, suitable materials and protective devices that are built into such systems, as well as to their generally fortunate situation as regards winter. Unlike highways and streets, which are in the open and are exposed to snow and to ice formations, many of our sanitary facilities can be placed underground or can be well housed and protected. Nevertheless, there are things that should be done before cold weather comes to make assurance doubly sure that winter interference will be reduced to a minimum.

Last winter, your Editor wrote to a number of the State Sanitary Engineers in, shall we say, our normally colder states, to get their recommendations. This article is based on their replies. Some of the data are general in nature. For instance, Arthur E. Williamson, Director of the Division of Municipal Engineering, North Dakota, says: "We have tried to carry reminders in our Official Bulletin . . . at appropriate times. . . One method we have used is through the strip cartoon Herkimer. We feel this type of reminder is effective as Herkimer has quite a following in our Conference."

From Minnesota, Frank L. Woodward, Director of the Division of Environmental Sanitation, writes: "We do not have any written rules or regulations for preparing utilities for the changes in seasons. As you know, we have rather extreme temperatures during our long winter, and the operators must of necessity prepare for unfavorable weather long before it occurs. We seldom hear of freeze-up in municipal systems. Because of the cold, our plants are quite generally enclosed and for this reason we avoid some of the difficulties with freezing that might develop where winters are not so severe."

From Maine, E. W. Campbell, Director of the Division of Sanitary Engineering, reminds us of the differences that exist between Maine and other states in regard to supervision of water supplies and sewage treatment plants. The immediate supervision for the development, operation and protection of water supplies is under the Public Utilities Commission and not under the health organization, though the latter has supervision of testing and sampling. The health organization likewise has no direct supervisory powers over sewage treatment, excepting for those plants located at public institutions. In the absence of direct authority for supervising and regulating, no regulations regarding operation have been issued.

Ohio—The following suggestions in regard to sewerage facilities have been prepared by John E. Richards and Ward E. Conrad, assistant sanitary engineers of the Ohio State Department of Health, F. H. Waring, chief engineer. For sewers, the following are recommended: (1) Periodic checks of sewers for free flow or evidence of stoppage in early fall and for excessive infiltration in the spring. (2) Checking heating equipment in pump stations and similar locations prior to winter use, and cleaning and storing properly after winter use. (3) Inspecting flow regulating equipment to insure proper operation prior to normal wet weather seasons.

For treatment plants, they list the following things to do: (1) Provide maximum sludge storage space in digesters prior to the onset of winter, commensurate with continued satisfactory operation of the digesters. (2) Make maximum use of late summer and early fall sludge drying bed space to insure maximum sludge storage space in the digesters. (3) Remove all sludge possible from the drying beds in early fall, so as to provide as many open beds as is feasible and to alleviate the difficulties of winter removal. (4) Change to winter lubricants as recommended by equipment manufacturers.

(5) Drain or pump out piping subject to freezing, including condensate traps, prior to cold weather and provide antifreeze solutions for water seals on equip-

Facilities Ready for Winter

ment that may require such protection during freezing weather. (6) Check the operation of heating equipment in plant structures before placing it in operation and make the necessary repairs; provide proper maintenance immediately after the season's use. (7) Provide protection for flame traps or remove them during freezing weather; and provide adequate protection for exposed gas lines. (8) Place ice control materials early for possible use in and around the plant; and in the spring clean up any residue as promptly as possible. Get the snow plow at the plant in good working shape and make arrangements with the street department to plow the plant out in the case of very heavy snows.

Illinois—C. W. Klassen, Chief Sanitary Engineer, Illinois, writes at some length and also encloses copies of the Division of Sanitary Engineering publication, "The Spillway," which contain good advice for operators. He says:

(1) Standby operating equipment should be thoroughly checked and put in good operating condition so in case of power failure during the winter this auxiliary equipment can carry on until electric power is on the job again. We have experienced, several times in Illinois, severe ice storms which have broken power lines. Since many of our smaller water supplies carry only one-half to one day of storage, it is most important that the auxiliary power units be in shape ready for operation.

(2) At least a 14-day supply of the chemicals used for coagulation, taste and odor control and disinfection should be maintained. Experiences have shown in the past that there may be difficulty, especially under severe weather conditions, in obtaining these chemicals on short notice.

(3) See that all window glass is replaced, especially that near water lines, meters or other accessories. It is also a good thing to prevent freezing at the point of use, to remind consumers to replace window glass near meters or water piping in their homes.

(4) It is a good thing to patch up cracks in the concrete of the plant structures so that winter freezing and later thawing will not cause damage.

(5) Tastes and odors have often been a problem in winter, especially those due to *Synura*, so threshhold odor tests should be run regularly and equipment and materials should be available for controlling these winter tastes and odors.

(6) False chlorine residuals may be caused by iron, manganese, nitrites or microscopic growths, and these are most likely in the spring of the year. Necessary tests should be run from time to time to determine if there are false residuals.

(7) During severe cold weather, some steps should be taken to prevent ice formation on the settling tanks. This can be accomplished by raising and lowering the level in the tanks (and it is a good thing to do the same in elevated tanks); or, in settling basins where raising and lowering is not feasible, logs can be placed around the basin, unless the basin is equipped with collectors. In such case, the ice formation should be broken up frequently.

Mr. Klassen adds: As a rule of thumb indication of the growth of algae, we have pointed out to water-plant operators the necessity of watching pH tests. If there is a progressive increase in pH, it is an indication that algae growths are developing and control methods should be applied.

In the *Spillway* is quoted a discussion by Hjalmer Stalin, assistant water superintendent of Rockford, Ill., in which he says: Testing of hydrants is done every fall and records are kept of each test. Before starting the tests, the Fire, Street and Sewer Departments are notified. If there is anything wrong, the record of that hydrant is placed in a separate file and the hydrant is repaired as soon as possible. The hydrants that have a slow or "no drip" are watched very closely after the cold weather sets in. Whenever a report is received that a hydrant has been used, a check-up is made and if the hydrant does not drain properly, it is pumped out and repaired.

Iowa—Material prepared over several years covering seasonal operation of sewage treatment plants and outdoor swimming pools has been forwarded by Paul J. Houser, Director of the Division of Public Health Engineering. The data relating to servicing sewage treatment plants in preparation for winter are essentially as follows:

(1) Service all mechanical equipment and repair as necessary.

(2) Clean and repair siphons and siphon chambers.

(3) Check and clean heating equipment, including auxiliary equipment.

(4) Clean and repair all distribution equipment on filters; check the mercury or other seals and oil the rotary distributors as indicated.

(*Continued on page* 80)

All photos courtesy Dorr Co.

● **IN COLD climates, trickling filters need careful winter attention.**

● **SLUDGE pumps can freeze up unless protected in cold times.**

Where SNOW and ICE CONTROL is a BIG PROBLEM

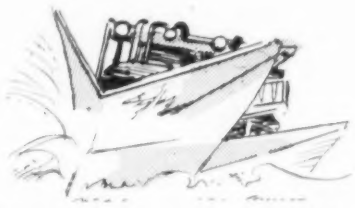
C. LELAND WOOD
City Manager
Watertown, New York

LOCATED in the northern section of New York State, Watertown is about eight miles easterly from Lake Ontario and about twenty-five miles southerly from the Canadian border and Thousand Island area of the St. Lawrence River. We are in a latitude where lots of snow and ice is expected in winter. However, plenty of snow is desired, to provide winter training for army units at Camp Drum nearby.

The average snowfall in Watertown over a period of years is about 100 inches. Infrequently a local snow storm has deposited about half the annual average figure in twenty-four hours, as occurred on December 17, 1952. In many years the intensity of snow storms causes little difficulty, since the total fall is spread evenly throughout the winter and, during such seasons ice control costs are high.

We have subscribed for weather service reports in winter during the past four years. The Department of Public Works is informed at least eight hours in advance what to expect of a storm. These predictions indicate when a storm will begin, its intensity and duration. Any variation from the first notice is promptly indicated by telephone so that changed conditions may be met.

In winter, two extra service men are placed on duty at department headquarters at night to render prompt service. When weather conditions change during the night, resulting in slippery driving on the streets, the service men make necessary calls for additional help as needed and start out with cinder



spreader trucks to treat listed locations in order of importance. If the severe ice conditions on streets continue, sand and salt spreader units are dispatched to assist in relieving the situation.

Salt and Abrasives

Salt and abrasive spreading units are sent out frequently in the early morning hours after a slight fall of snow as automobile traffic creates a slippery condition. Many times it is necessary to continue ice control work throughout the day. Salt is being depended upon more each year for satisfactory control of ice and snow and provide safer driving in public streets.

For many years the Public Works Department has been able to arrange with the New York Central Railroad to deliver cinders in cars on the Public Works Department headquarters switch, free of charge, from its local roundhouse. These cinders were unloaded as used or stockpiled for winter use as necessary.

With the discontinuance of use of coal burning steam locomotives and the substitution of Diesel units, the City faced a shortage of cinders. Fortunately two local manufacturing plants were desirous of disposing of cinders, so the City arranged to purchase them at 40 cents per yard. The Public Works Department trucks remove the cinders from the factory bins during the year and stockpile them at its headquarters yard for winter use. Salt is spread as the stockpiles are enlarged to prevent freezing in cold weather.

Sand is obtained from a local pit in the fall of each year and stored in bins in a heated building. Occasionally it is necessary to supplement the supply of sand during the

● **WINTER scene in Public Square, Watertown, following a heavy fall of snow. Snow has been plowed and streets salted. Original Woolworth store in background.**

winter, depending on the amount used. The wet sand purchased in winter is passed thru the heating drums of a local private bituminous mixing plant, at a nominal cost and then used immediately or stored as usual.

Watertown has about 85 miles of paved streets which require attention because of snow and ice in winter. The duration of the winter season is about four months, starting in December and ending about April first. Rarely are there snow storms of any consequence earlier or later than the period mentioned

The Department of Public Works handles most all of the snow and ice control operations. The Electric Department and the Park Department are assigned the work of plowing snow in a few streets in the outskirts of the city adjacent to their headquarters.

The Electric Department plows snow in a few streets surrounding its municipal hydro-electric plant. It uses a 7-ton FWD truck and mounts either a V-type or a moldboard plow depending on the depth of snow to be moved.

The Park Department must maintain traffic on the park drives, especially for fire protection, but also for other public uses. The Park Entrance and other streets adjoining the park are assigned to the Park Department for plowing of snow when needed. This Department operates a Brockway heavy truck chassis equipped with a V-type or moldboard plow depending upon depth of snow, plus a right-side wing for widening operations.

The Department of Public Works is adequately equipped to cope with all except extreme snow conditions which may obtain once in ten years. The following equipment is owned and available:

- 4 7-ton Walter chasses, with V-type and/or moldboard and wing.
- 8 5-ton trucks using moldboard plows.
- 1 Small Sno-Go rotary plow.
- 2 Baughman sand and cinder spreaders.
- 2 Scotchman salt spreaders.
- 2 Nelson elevator type loaders.
- 3 Light tractor bucket loaders.
- 1 Hough heavy tractor bucket loader.
- 1 Adams heavy motor grader.
- 1 Caterpillar heavy crawler dozer.

The municipal airport owns snow moving equipment as follows:

- 1 Large Sicard rotary plow.
- 1 Medium truck and moldboard plow.
- 1 Ferguson wheel tractor and blade plow.
- 1 Rotary disc sand spreader towed behind a dump truck.

On two occasions in the past ten years, the large airport rotary plow has been enlisted to cope with heavy

TABLE 1—COMPARATIVE DATA FOR A THREE-YEAR PERIOD

	1950-51	*1951-52*	*1952-53*	*To 3/1/54*
Snowfall—inches	125.8	120.6	44.2	60
Salt —tons	510	306.5	359.8	...
Sand —yards	75	100	175	...
Cinders —yards	860	956	1236	...
Budget	$49,650	$57,700	$59,734	$57,610
Cost	49,731	66,685	43,651	44,122

● **LOADING cinders into a Baughman spreader and sand distributing unit with a Hough tractor shovel. Cinders are salt-treated to prevent freezing in the pile.**

● **SNOW plow at work, showing type of mounting. This is a Walter truck. A 5-ton concrete block gives weight to provide traction. V-type plow can be substituted.**

● PLOW has made one trip here; later it will return to "wing back" the side banks.

drifted snow in outlying streets. Several times some of the Public Works Department snow equipment has been diverted, after clearing City streets, to assist in clearing the airport runways.

Organization and Procedure

The City is divided into four districts by the Public Works Department. One Walter plow unit and several truck units are assigned to each section. The operators designated for each district are acquainted with the streets and any obstructions which may be hidden by snow, hence more prompt and faster service is possible, and there is less liability of accident.

Most of the snow storms seem to occur during the night and/or on week-ends. When it is necessary to plow snow on extra time the hourly employees receive compensation at double rate. Foremen may receive compensatory time off for extra service work resulting from snow storms.

A snow storm occurring during the daylight hours or in the early part of the night, presents a difficult problem of plowing on account of automobile traffic and parking in the streets. Little or no snow plowing can be accomplished during the day in the busy streets; however, some plowing can be done in the residential or sparsely settled areas.

No all-night parking in City streets is permitted by ordinance so that in winter the snow plows can proceed without delay to clear the pavements. Most of the snow plowing is undertaken from midnight until 8:00 a.m. after a fall of snow.

Business streets, arterial thorofares and bus routes are plowed first. Residential streets are cleared second and the dead-end streets attended to last. Some of the heavy plow units are radio-equipped, as are the ice control trucks, so orders may be dispatched direct to the operators, while in action, if special attention is needed at any other spot in the City, before returning to headquarters.

In some of the unprotected outlying streets, regardless of snow fence installations, intense drifting is expected. Where heavy concentration of snow is experienced the V-type plow and wing is used. Sometimes it is necessary to use rotary plows to open a passage through extra deep drifts and frequently to move windrows of snow pushed to either side of the streets in unoccupied sections where it can be blown onto vacant land adjoining.

Snow removal from the main business streets is started as soon as the plows have finished work. For years a snow dump, located on the down-stream edge of a rocky island in Black River which flows through the center of the city, has served very satisfactorily. The island is but a short distance from Public Square which is the center of the business district. The surface of the island is about 30 feet above the water level in the river and at the dump site a vertical rock face permits trucks to back up against a heavy bumper and discharge snow into the water where it is carried downstream by the swift current. A recent change in ownership of the snow dump portion of Beebee Island made it necessary that the City acquire title to the dump site and access thereto. After two years' negotiations and threats of trespass and condemnation, the City gained title to the facility which it and many others have used for years.

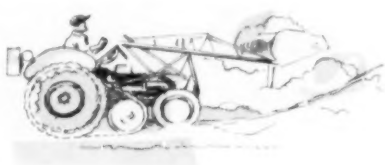
The snow is loaded into City-owned dump trucks, and rented trucks when necessary, and disposed of at the dump. Two Nelson loaders handle most of the snow although the tractor loaders and even the rotary have been pressed into service. The trucks are equipped with an extra wooden snow box mounted on top of the regular dump body so that a much larger load of snow may be accommodated.

In sections of the business district where parking meters are installed, it is necessary to place temporary "No Parking" signs on the meters for at least one hour in advance of snow loading so that automobiles will not interfere with steady progress of the equipment. Infrequently an automobile has not been moved for some reason, in which case, if the car is locked, it is towed away.

Merchants have been very cooperative in shoveling walks in front of stores so the loaders can pick up all of the snow without delay. It is necessary for two men to attend the front of the loader to handle any spilled snow and remove snow left on the sidewalks between meter posts. One operator is needed on the loader and one man to direct the truck driver in backing up in following the loader unit. Immediately a truck is loaded it moves away and an empty truck takes its place.

There are a number of bridges with sidewalks spanning Black River in the city, also other city walks which must be cleared of snow regularly. In addition to the snow equipment listed two small rotary plows are used to serve bridge walks and other City walks.

Snow and ice control in a city like Watertown is a problem. The public demands that ease of traffic movement be as nearly as possible the same in winter as in summer. The better the snow and ice control, the more insistent the public is that it be adequately served regardless of cost. Only when tax revenues are demanded to foot the bill does John Q. Public begin to complain about payments, and then it is necessary to explain this item of expense in municipal operations.



Power Digger
SAVES MONEY FOR CITY

THIS is how the City of Hopkins, Minnesota, uses a Ford tractor with a Sherman power digger and a heavy duty front-end loader to speed the work of city departments, and accomplish savings estimated at some $4,500 per year. According to City Manager W. R. L. Taylor, the city, which has a population of 7,595, has benefited tremendously, nearly every public works department in the city finding use for this light weight excavating and loading outfit.

One of the most troublesome problems facing the Water Department of Hopkins was that of properly cutting off discontinued service lines from the city water mains at the corporation cock on the main, rather than to allow the water to stand under pressure in old unused service lines. Such an operation requires digging a hole through the city street (black top in most instances) some 3 ft. wide by 6 ft. long by 8 ft. deep. This hole must be plumb walled in order to avoid replacing any more pavement than necessary. "Prior to the time we had our Sherman power digger" says the City Manager, "this operation required tying up a truck all day, an air compressor for about half a day and two men with picks and shovels for a full day. Now we can accomplish three such jobs in one day, with only one man on the digger, no truck, and seldom an air compressor. An air compressor is still required when the pavement to be broken through is of concrete. The Sherman digs right through the black top pavement that is in place on most of our city streets. One reason the time required on most of these jobs has been so greatly reduced is that, by using this machine, we dig the hole, make the repair, and back-fill before the walls of the excavation begin to cave. Previously, we had to crib each such excavation, because of the soil in many spots."

The Sewer Department finds the Sherman digger a big help in repairing sewer mains and laterals, where tree roots have caused damage. With this machine it is a simple and quick matter to dig down to the main or lateral, remove the roots with hand tools, and encase the sewer tile in concrete to prevent recurrence of the damage. Jobs that used to require a crew of men for a whole day are now done in a matter of hours with two men.

● **THIS is the kind of hole that must be dug when it is necessary to cut off discontinued service lines. Small hole area reduces amount of pavement replacement.**

A number of secondary uses have been found for this equipment, such as breaking up concrete slabs from old sidewalks and curbs which are removed for replacement or to make way for widening of streets. By using the digger to lift these slabs, and drop them on adjacent slabs, they are broken up nearly three times as fast as was formerly accomplished using air tools. They are then easy to load with the front-end loader.

There was one job last December on which a Sherman power digger proved itself especially valuable. A water main broke at the intersection of Blake and Excelsior Streets, putting some five hundred homes out of water. By the time the break had been reported, an investigation made, the damaged area pinpointed, and the repair crew assembled it was about 7:30 in the evening. Starting at that time, with a Sherman doing the excavating, a hole was dug about 10 ft. by 6 ft. by 8 ft. deep, the leak repaired, the hole back-filled, water service restored and traffic resumed over the excavation at 10:40. This happened before the city had its own Sherman equipment and it was fortunate that a contractor could be lo-

cated quickly and was able to provide this emergency service. Since then the city has purchased its own unit.

In wintertime when excavating is hampered by frozen ground, the city finds still another use for this equipment. An average of six heavy snow-falls occur each year. After each snow-fall, it is necessary to clear snow from around the 250 fire hydrants in the city. Due to the risk of damage by heavy equipment, this was formerly accomplished by hand, at a cost to the city of approximately $1,650 per year. The city now employs the front-end loader of the unit and accomplishes this snow removal in much less time and at a cost of only $1,050.

● **THOUGH shown here loading dirt into a city truck, the Sherman digger is also utilized in winter for clearing snow around fire hydrants, saving $600 per year.**

WE USE WINTER TO REPAIR PAVING EQUIPMENT

EMIL HALIK,

Equipment Superintendent,

Oregon State Highway Department

SUCCESSFUL maintenance of highways requires suitable equipment in constant good repair. In Oregon, a steady shop crew is required on repair and conditioning of equipment such as trucks, graders, pickups and cars all the year. During the summer, snow plows, sanders and power shovels require annual overhaul and in the winter, paving plants, spray machines and oiling crew equipment receive attention.

For dependable operation, we find an annual overhaul of most equipment is necessary to avoid frequent breakdowns during rush seasons. Our four shops handle breakdowns promptly or send mechanics to the field in some cases to make repairs. The annual overhaul provides the opportunity to place equipment in adjustment and to replace all worn parts before they break down.

The equipment used in the regular paving and oiling operations, which run from six to eight months in length each year, is overhauled in our heavy machinery shop during the winter months.

Each paving plant is completely overhauled between November 1st and April 1st. The overhaul consists of replacing pugmill liners and paddles, repairing cyclone dust collectors, overhauling skip hoists and buckets, installing new refractory linings in the combustion chamber and replacing all sprockets, chains and pillow block bearings that are worn beyond certain limits.

The diesel power unit, blowers low pressure burners, and asphalt heating and pumping systems are completely overhau'ed. The weighing system is overhauled and recalibrated. The closing and opening mechanism of the pugmill door, both air and hydraulic systems, are completely overhauled. The drying drum, trunnions, and bearings are checked and necessary repairs made which may include a new drying drum. Upon completion of this overhaul, the plant is set up in our yard and run and tested before it is sent to the field.

There are 29 mechanics in addition to the supervisory clerical help in the heavy machinery shop. The paving plant operator is usually given a job during the winter months in the shop. He actually works on his plant with the shop mechanics and if any major changes or additions are made he is then familiar with them. The same procedure applies to the balance of the equipment used with the paving plant. These include the asphalt kettles, 6-8 ton tandem rollers, trailer tank equipment and patrol graders.

The oiling crew equipment which consists of the distributor, retort, steam boiler, asphalt tanks, three-wheel 10-ton rollers and half-yard shovels are also overhauled in the heavy machinery shop. The same repair procedure is used on all this equipment as on paving crew equipment.

When these plants leave the shop in the spring we are reasonably well assured of an uninterrupted season.

There are other types of equipment such as loaders, mowing machines, spraying equipment, air compressors, concrete mixers, earth moving equipment and pneumatic equipment which are being overhauled and reconditioned at the same time. The automotive equipment including cars, pickups, station wagons and all types and sizes of trucks are overhau'ed in the automotive shop whenever, according to our records, an overhaul is necessary, which may be any season of the year. There are 50 mechanics in addition to the supervisory and clerical help at the automotive reconditioning shop in Salem.

The same procedure is followed in the branch shops located at La Grande with 48 employees; Klamath Falls with 29 employees; and Coquille with 17 employees.

THE SYSTEM THAT CURED OUR RECORD KEEPING HEADACHES

WILLARD S. JEFFRIES,
Chief Accountant,
Water, Gas and Electric Departments,
City of Danville, Virginia

OUR city has experienced a considerable growth in the use of its utility services by the general public. Being in the unique position of owning all facilities, distributing water, gas and electricity and offering these services to our customers within the immediate city limits and surrounding rural areas, we have witnessed a phenomenal expansion in the consumption of these services.

We have seen the number of water customers grow in our city from 6,500 in 1940 to 9,500 in 1953. Natural gas was distributed to 7,300 customers last year as against 4,500 manufactured gas customers in 1940, a rise in part accounted for by our changeover to natural gas in 1950. We own our own hydro-electric generation station and steam plant, and last year distributed electricity to 22,000 customers as against 11,500 customers in 1940.

The rise in dollar revenue from utility operations from $987,400 13 years ago to $2,971,000 last year further attests to the steadily growing consumer demand for our services. Accompanying this growth of our publicly owned utilities has been a general decline in rates for consumers.

At the same time problems of recordkeeping began cropping up. By the early '50s they had reached such a point that we realized they had to be remedied. High on the list were our meter reading record books, which were set up by district and comprised the only record pertaining to the customer. Basic to any dealings with the customer, these records had grown to such proportions that by the early '50s we had accumulated over 100 such books. Cumbersome to handle, they required a good deal of page thumbing in order to locate information on a customer's account.

Older personnel, long familiar with the setup, fell back on memory to search out an account. New personnel were required to go through a lengthy training period before they were of value in handling customer interviews on changes of address, new contracts, turning on and cutting off service, and complaints.

The greater the number of customers, the more people had to come into the office for record changes—and the greater our problems became. This meant, among other things, added personnel for whom space had already become tight. Customer service, particularly on peak days when 125 orders may have been taken, became increasingly poor.

New Procedures

New procedures were indicated. If a customer was using service at any given address, why not change the service by telephone without requiring the customer to come in and sign a new contract? Adding a change of address seemed sufficient. Also, it appeared to us that the amount of time spent retyping order forms when customers moved from one location to another could be cut considerably.

Taking all of our problems into account, we spent three to four months studying the utility recordkeeping system in other cities. We found in Remington Rand's Kardex system the answer to our needs, and many advantages we had not foreseen. By setting up a history card file and location file, we now find

● **AUTHOR, Willard Jeffries, discusses customer accounts with Mrs. Herndon, supervisor. Note signal tabs.**

● **DAILY posting of all transactions insures that customer accounts are up-to-date and current at all times.**

information on a customer within seconds. We now handle a 15 percent increase in volume of work with the same number of personnel we had 12 months ago.

Our personnel were formerly torn between personal interviews with customers and telephone service. Our encouragement of the use of the telephone, and the separation of this service from personal interviews with customers together with changes of procedures under the new system, have made for a more efficient, more relaxed working staff. Morale is higher, with lowered fatigue. Moreover, if we had had to go along under the old meter book system of a year ago, we would not be able to get by with the same amount of floor space. Our new system will permit us plenty of growth in the years ahead.

Training is now achieved in a minimum of time. Within a few days a new employee has grasped the system and becomes immediately of value, as she locates customer information with ease and speed. We used to have a clerk spend 2½ days each month posting customer deposits and credits. Customer deposits are now a part of our Kardex history record, and all transactions are posted daily. A system of color signals highlights the changes in the individual account within a 30-day period. Customer deposit accounts are now current at all times.

We are not at a loss when a customer comes in with insufficient information, or without a bill; an account number is always obtained within seconds. Even on peak days no more than two persons are responsible for handling customers who come in to the office to place service orders.

When we set up our new Kardex system about a year ago, we arranged the customer history cards alphabetically and by code. The history card provides for 10 address changes along with name of customer, occupation, date of contract, deposit record and service record. A green slide tab indicates when a customer changes from one location to another. A red tab indicates service was cut off for non-payment, and where service was cut off a number of times a red circle emphasizes this fact. If a deposit had been made within a month, a purple or an orange tab calls attention quickly to the card for the rapid addition of such deposits by the month.

We balance our customer deposit account cards in the history file with our control ledgers monthly. All deposits by A's, B's, etc., are added alphabetically and totals checked, thus permitting our history card file to serve as a check on customer transactions.

We also maintain a location file arranged alphabetically by streets for accounts where streets are numbered, and numerically by house numbers for all city accounts. Rural locations are set up by highway and service pole numbers. A rural address that once may have caused us endless page-thumbing of meter books is now found in seconds.

Location cards represent every location in the city limits or rural area where our services are offered. On this card are listed the different types of service, and the dates these services were put into use. When a service order is taken, the clerk circles the appropriate block indicating work desired by the customer. This simple circling eliminates filling out detailed forms.

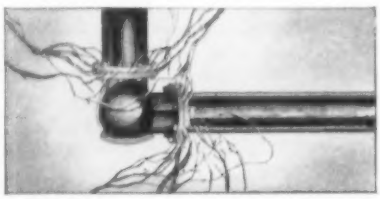
Our location file has proven invaluable where customers bring in insufficient address information. By ascertaining a neighbor's location or former occupant of the residence, we can put our finger on the address immediately. Colored signals are used to indicate cut offs in service on this file.

(*Continued on page* 136)

Getting Hydrants Ready for Winter

Year-round hydrant care and special precautions to prevent winter damage is the theme of a series of advertisements prepared by the Watrous Company. The illustrations below, furnished through the courtesy of this firm, show measures for fall and winter maintenance.

● **WINTERIZE** now to save trouble next winter. Inspect each hydrant for cold weather operation. Lubricate according to instructions.



● **LOOK** for cause of slow hydrant draining. It may be tree roots or poor soil drainage. Quick drainage is important during winter months.

● **MARK** hydrants so they'll be visible to firemen and snow plow crews. Check regularly for possible damage by snow plows or autos.

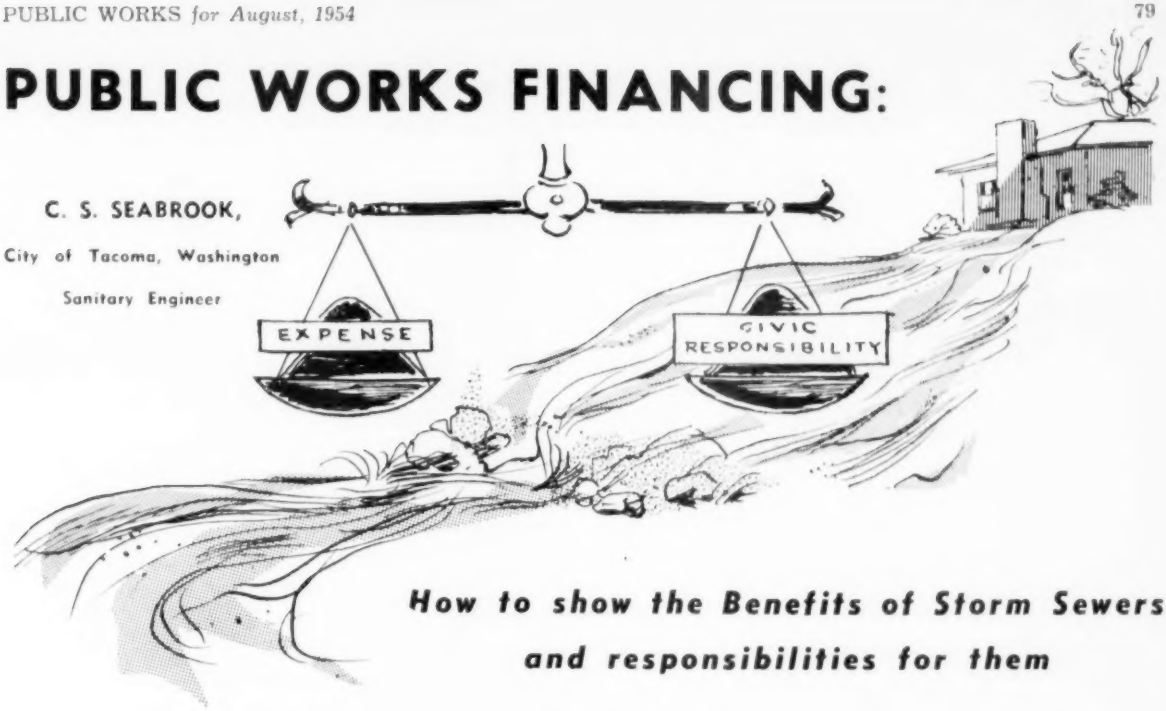
● **INSPECT** after use for fires, flooding rinks, etc. Frequent use may saturate ground around drain. Pump out by hand if necessary.

● **KEEP** hydrants free of snow. Enlist volunteers or request property owners to help keep hydrants clear and visible for their protection.

● **PROTECT** from freezing by use of non-corrosive, non-inflammable antifreeze when needed. Never use corrosive solutions in hydrants.

PUBLIC WORKS FINANCING:

C. S. SEABROOK,
City of Tacoma, Washington
Sanitary Engineer



How to show the Benefits of Storm Sewers and responsibilities for them

FINANCING any public works project has always presented a serious problem, particularly when the circumstances require that the involved property owners cast the deciding ballot. Storm sewers have differed little from other improvements in this respect, generally following along in the same pattern. Due to changing circumstances, however, and particularly for the reasons outlined hereafter, the future for storm drainage facilities appears to be clouded.

Before the era of sewage treatment plants a large majority of all sewers were of the combined type, carrying both storm and sanitary sewage. The financing of such sewers, while undoubtedly beset with difficulties, as a rule entailed no more than average trouble. Most property owners have always recognized the necessity for sanitary sewers; have long since been reconciled to the fact that it is their responsibility to pay for them; and have generally shrugged off or been oblivious to the fact that a combined sewer was much larger and far more expensive than a sanitary sewer.

With the advent of sewage treatment, combined sewers for the most part have been relegated to the discard, for the volume of storm flow is so great that to construct a treatment plant capable of handling it would be financially out of reason. As a result the trend has been and undoubtedly henceforth will be toward the construction of separate storm and sanitary systems. This means that storm sewers will have to be financed strictly on their own merits, an undertaking which from all appearances is going to be extremely difficult.

There will be isolated cases of course, where storm damage is so great that public reaction will automatically approve whatever remedial construction is indicated. In general, however, it can be stated categorically that if a favorable vote of the majority of the property owners is required, the financing of any major storm sewer project will be doomed to the roughest sort of going. Locally we have witnessed several instances where proposed storm sewers were voted down cold, and in areas that had just taken a most severe beating from storm damage.

Opposition Bases

Such opposition almost invariably stems from the failure of the property owner to recognize or concede any responsibility in the matter of storm water falling on his land and running off onto someone else's. In the case of a sanitary sewer system the service rendered is obviously just as beneficial to one home as to another but in virtually any storm drainage district, regardless of size or shape, only a minority of the people live on the lower ground and are damaged when there is a heavy rain. These people are more than willing and anxious to participate in the cost of any improvement that will relieve the situation. The majority of the residents however, live either on the hillsides or the hilltops and suffer no damage at all, no matter how hard it rains. These residents doubtless believe in all sincerity that they are not benefited by storm drainage improvements and for the most part will steadfastly refuse to approve or participate in the cost of such work. This attitude, while unquestionably sincere, is wholly erroneous.

Property owners in this category lean righteously on the theory that if they are not benefited by an improvement they have no obligation to help pay for it. This of course is basically true, but it immediately poses the question of what constitutes a benefit. For the answer to this we must examine among other things the relationship between benefits and responsibility. As a starting point, this much would certainly be generally accepted as axiomatic: That if we have a recognized responsibility, and something helps us to discharge that responsibility, then that something is of direct benefit to us.

Regarding the matter of responsibility, in any metropolitan or reasonably well developed area, one would not dare think of depositing sewage or garbage on neighboring property. These things are waste products and are disposed of as such. To the average person, however, storm water would never be considered a waste product; but it is a waste product, nevertheless. The fact that nature was responsible for the rain that produced it is

no argument to the contrary at all for nature also made it necessary to produce sewage and garbage, and man has no more control over the existence of one than the other. One comes at regular intervals, the other at random, but that both will come is as inevitable as the rising of the sun. Moreover, under certain conditions storm water can be more damaging than either sewage or garbage. Consequently it is very difficult to see how excess storm water could be considered as anything but a waste product, and when people are living in communities, the matter of responsibility in disposing of waste products is recognized and accepted by virtually everyone. It therefore follows that if, for the man living on the hill, a storm sewer will provide the means of discharging his responsibility in disposing properly of excess storm water, then that storm sewer is of definite and direct benefit to him.

Now should there still be any reasonable doubt as to his responsibility in this matter of storm sewers, there is at least one more very sound reason why this property owner on the high ground can neither disclaim nor ignore such an obligation.

Before he built his house, paved his street, and created all the impervious surfaces attendant to such improvements, approximately 80 to 90 percent of the storm water that fell on his land either soaked into the ground or was held back by local depressions and the natural vegetation. No more than perhaps 10 to 20 percent of it ran off onto his neighbor's land. However by his deliberate act in substituting roofs, paving and other impervious surfaces for the original ground, he collected and concentrated the water to such an extent that instead of discharging from 10 to 20 percent of the storm water onto neighboring property, he was then wasting probably 40 to 50 percent of it onto others.

The Legal Problem

The legal aspects of this phase of the situation would provide an interesting court case. Generally speaking it is normally recognized that the only prohibition involved in the common law conception of "outlaw water" is that a person may not concentrate such water and then discharge it upon neighboring property. Whether or not the above referred to property owner's act in creating the various impervious surfaces, which resulted in the flow of concentrated water onto neighboring land, would be construed by a court to be an infraction of the law, is difficult to say. From a practical and realistic standpoint however, this man has done exactly what the law forbids. Furthermore, regardless of what the legal status of the situation might be, this man is certainly faced with the moral responsibility of contributing his share toward the cost of whatever measures are necessary to alleviate the problem which he has created.

Thus on two specific counts this hillside property owner has incurred a serious responsibility which can only be discharged through the construction of a storm sewer. It therefore follows that such a storm sewer would be of very direct benefit to him and he can certainly have no moral or legal reasons for not supporting it.

The Final Problem

The final problem of course, is what to do about it—how to get the property owner's acquiescence in the line of reasoning above outlined. Certainly there is nothing in it that could be written into the statutes. The problem would appear to be purely of an educational nature, with a successful solution depending upon how intelligently it is handled. The philosophy of benefits and responsibility as outlined above is a perfectly rational and commonsense approach to the situation. However, since we are so glibly assigning certain responsibilities to the property owner, we cannot overlook the fact that those of us who have given the matter perhaps a little more than ordinary thought, have an equally important responsibility —that of explaining the situation so these other people will understand it.

Just what modus operandi can be most effectively employed will depend upon the circumstances. At best the job will not be easy. As these comments are written there is a certain large area in this city where storm sewers are so badly needed that recent property owner requests for street improvements have been denied because of the lack of drainage facilities. Still it appears probable that a petition for storm sewers in this area will be voted down.

The job will be anything but easy. As a matter of fact it would appear that the services of some master salesmen will be required; but unless some serious efforts in this direction are initiated the financing of storm sewers is going to become increasingly difficult.

Getting Ready for Winter

(*Continued from page 71*)

(5) Provide windbreaks, at least on the north and west sides, and preferably around the entire periphery of trickling filters, to prevent winds from blowing spray to form ice, on the filter structure.

(6) Remove dried sludge from the beds for early spring drawing, if this becomes necessary. Draw enough sludge from the digester to allow sufficient storage for solids accumulations through the cold months.

(7) Protect all valves from freezing and check drain valves for proper functioning.

(8) Clean and mound sand filters, where used, 12 to 13 ins. high on about 8-ft. centers, or ridge the sand in about the same way, so that ice will not prevent the sewage from reaching the sand.

(9) Make provision for ample operating help and equip the operator with necessary ice and snow control equipment so that he can operate the plant safely and comfortably.

• • •

Looking Forward to the Need for Garbage Grinders

The installation of garbage grinders in new or reconstructed residences, apartments, or business establishments where food wastes are handled is now required in Beverly Hills, Calif. Other California cities with such ordinances are Pomona and South Pasadena. City officials anticipate that the feeding of raw garbage to hogs will be prohibited by the state and that it might become necessary within the next few years to impose a substantial charge for the collection and disposal of garbage where garbage grinders are not used. In South Pasadena, where the city has required garbage grinders for more than a year, garbage grinders have been installed in approximately 5,000 residences. According to Public Management, the city charges householders 60 cents per month for garbage pickup and an additional 40 cents for noncombustible refuse consisting principally of tin cans. When a garbage grinder is installed the owner applies for and is granted a waiver of the 60-cent monthly charge for garbage collection. City officials report that the transition to grinders in new and reconstructed units is being made with very little difficulty.

● **HERE is a view of South Claiborne Ave. at night, after the new lights have been installed to give 1.0 to 1.2 ft.-candles intensity on the street surface.**

FLUORESCENT MERCURY VAPOR LIGHTS *in New Orleans*

GUY BROWNING ARTHUR

SOUTH CLAIBORNE AVENUE in New Orleans formerly consisted of two lanes bordering one of the old drainage canals which cross the city. The two roadways 30 ft. wide and the 94-ft. canal strip made a right-of-way 154 ft. wide. Street car tracks were in place on both roadways. There were three dangerous curves, and others less hazardous. The street was lighted by 4000-lumen filament units suspended from wooden power poles at street intersections.

New Orleans celebrated the complete rebuilding of this important thoroughfare downtown last January. There were speeches by Mayor deLesseps S. Morrison, Utilities Commissioner A. Brown Moore, and others, with a 50-unit parade of vehicles used in public service. The occasion was notable for bringing the administration's comprehensive public works program to the attention of the public.

In 1946 the city embarked on an ambitious schedule of public improvements to cost $50,000,000, with a master plan which is expected to insure orderly growth for 25 years. The base of this plan is the new Union Passenger Terminal which is nearing completion at a cost of $2,500,000. Railroads through the city have been a problem for generations. Now "after 60 years of talk and seven years of action" the nine trunk lines will use one terminal. The depot, and the $17,000,000 supporting plant, are being financed by the railroads, but on completion will be owned by the city.

● **ANOTHER section of the street, showing Westinghouse luminaires mounted on American Concrete Corp. poles. These are prestressed and are 26 ft. 9 inches high.**

This major unit assured, it will be implemented by a series of "must" construction projects. These projects eliminate 144 dangerous, time-taking grade crossings, and include building 13 overpasses and 30 underpasses. The necessity for this construction created an opportunity that no wideawake city administration could overlook. All the streets crossing the new track layout had to be rebuilt at the crossings in any case, so a complete plan for widening, improving and lighting was worked out for these streets, along with the planning for the new terminal.

Such a program would be important in any city, but is critical in New Orleans. The city is really on the water, only a foot above the Gulf level, and its streets parallel the broad curves in the Mississippi River. It is the largest city in the South, with 700,000 metropolitan population, and its port is second only to New York in the dollar value of two-way foreign commerce. Normal growth was steadily pyramiding the problems of transportation, and solutions were not easy in the existing street plan. Therefore the courageous attack, pulling all the railroads into one terminal, facing the resultant complications with an over-all plan, must attract the attention of many city officials elsewhere.

The economics of the new plan, if ever fully determined, will be a valuable contribution to city planning in general, and to street and traffic departments in particular. The time lost on 144 grade crossings, along with the ensuing congestion, is one important item. Saving of time for the public in going to trains and in changing between depots is

● **DAYTIME view of section between State and Broadway. The graceful and unobtrusive light standards are a vast improvement over the old wooden poles.**

another. The certainty of reaching the station within a reasonable expected time will eliminate a ponderous accumulation of anxiety through the years. And the railroads must realize a substantial saving in operation costs when using one terminal.

South Claiborne Avenue is one of the most important thoroughfares. It brings U. S. Highway 90 into the center of the city from the west, forming the east-west meridian, as Canal Street is the nominally north-south boulevard. It presented unlimited possibilities for development into a great show-street when fully landscaped, as well as a carrier for a heavy load of traffic. Modern lighting was essential.

Albert G. Wyler, City Engineer, designed the new street. The old canal had been covered previously, and was already landscaped to some extent. In the new alignment the three bad curves were eliminated, and an open view ahead was worked out for practically the entire length of the improvement which extends 3.3 miles from Third Street to South Carrolton Avenue. The roadways were made 37 ft. wide by taking 7 ft. from each side of the neutral strip, which is now only 80 ft wide. "Neutral strip" is a local name for roadways.

a landscaped dividing strip between the South Claiborne project, $144,-000 has been spent for lighting, but the overpass over the approach tracks to the terminal is not yet finished. All of the work on lighting has been done by New Orleans Public Service, Inc., and the installation was designed by H. B. Ramsay, Senior Electrical Distribution Engineer in this utility.

There are 332 standards along the street, 166 on each side, spaced from 100 ft. to 125 ft. apart, averaging 106 ft. These were made by American Concrete Corporation in Chicago, and shipped by truck right to the job. The standard is Pole #660, 26 ft. 9 ins. high, with prestressed steel reinforcement and a granite surface. They are of the buried base type, set in 3 ft of concrete, or up to the wiring pocket. They were fully assembled and wired on the ground, then erected and set. They stand 2 ft. back from the curb in the neutral strip.

It is hoped by everyone that collision damage to these new standards will be reduced to zero. The street is now well lighted, and the poles are far enough back from the curb to escape car bumpers. The twisting curves have been eliminated. Before the street was improved the pole mortality was high. The damage was irritating and costly to the city, and to the car driver, if caught; and any temporary loss of light was serious on the dim street.

The lighting is by color-corrected fluorescent mercury vapor fixtures, JH-1 Type, with a rating of 19,000 lumens, giving an average intensity of light on the roadways of 1.0 to 1.2 candles. The lumenaires are Westinghouse IES Type III, and are 29 ft. above the roadways. The ballast is on top of the pole. The system is multiple, 120 volts. Control of the light is by relays on a pilot wire. A printed schedule of hours of sunrise and sunset throughout the year is the guide by which all city lights are turned on and off at the central power house.

A subcontract was let to Boh Brothers Construction Company of New Orleans for laying the Type RN jacketed cable along the neutral strip. All other work was done by New Orleans Public Service, Inc.

The South Claiborne project stands out because of its importance as a thoroughfare, but its lighting is actually a part of a five-year lighting improvement program. This, like the comprehensive public works program, is something new in complacent New Orleans, but it is going ahead with increasing appreciation from the public. The last lighting on streets was done in 1930, and in the intervening years modern street lighting has been developed. With the new project on South Claiborne more than 14 miles of main streets have been equipped with the most modern lighting, and three other stretches will soon be finished. In addition, more than 3000 new lights have been installed in residential districts, and good lighting has been provided for 56 parks and playgrounds.

V. E. Kissgen, Utilities Engineer in the Department of Public Utilities, was in charge of the design and execution of the lighting project for the city. A. Brown Moore, Commissioner of Public Utilities, was the driving force behind the project.

● **AFTER: Another view of South Claiborne Ave. after the completion of the lighting project.**

SNOW and ICE CONTROL

● SICARD Sno-go is one of the pieces of equipment used in the clearing of main streets.

On the Edge of the Cold Belt

WM. A. XANTEN

Superintendent,
Division of Sanitation,
District of Columbia

THE snow program of the District of Columbia Engineering Department comprises the plowing of snow from main thoroughfares and boulevards (342 miles of streets); the physical removal of the snow (by hauling) from the major business areas only (approximately 33 miles of streets); the progressive opening of crosswalks, catch basins, and fire hydrants; and the spreading of abrasives and chemicals on the more important hills and intersections. The combined forces of the Sanitary Engineering Department and the Highway Department are used on this walk, supplemented by a considerable number of hired trucks. Expenditures under this program, depending on the severity of the winter, can vary from a cost of $100,000 to a cost of $500,000 or more annually, based on the limitation of available funds. The major cost of the snow program is for the spreading of abrasives and chemicals and the hauling of snow from the 33 miles of business streets, principally in the heart of the downtown area but including several outlying business districts, bridges, and important intersections.

Plowing Program — The plowing program is confined to about 342 miles of arterial and heavily-travelled streets. This is a task of greater magnitude than is expressed by the linear mileage. The necessity of plowing from two to four or more lanes of traffic each way on the wide streets of this city, in addition to the replowing of those lanes as snow continues to fall, would perhaps argue for an expression such as "plow miles" rather than "miles" of streets, in order to present a more understandable picture of the task involved. Plows are started upon the accumulation of as little as a 2-inch depth and must be operated continuously during the snow storm to combat, as much as possible, the packing of snow by the heavy city traffic. Firmly packed snow is difficult to scrape off, and when turned to ice cannot readily be removed by mechanical means.

Emergency Plowing Program — The emergency plowing program for snows over 12 ins. deep is confined to 122 miles of arterial highways. This program is set up in the event of a heavy snow, and all available plowing equipment will be concentrated on these particular highways to keep them open for emergency vehicles to provide coal, fuel oil, food, medical treatment, etc., to residents of the District. After snow has stopped falling and the emergency routes are completed, efforts are made to deal with the regular plow routes. Heavy windrows at important intersections will have special attention.

Hauling Program — The complete removal of snow by loading and hauling in trucks (and disposing of it into sewer manholes and the river) is confined to 33 miles of streets in the downtown and outlying business districts. By the use of all available District labor and equipment, supplemented with extra labor and trucks, the program contemplates a force consisting of 1500 men, 375 trucks, and available mechanical loaders (now numbering 32) working mainly during the traffic-free hours of the night and for a number of shifts depending on the depth and severity of the snow storm. Some idea of the amount of work involved may be gathered from the following example of a ten-inch snow storm. This would deposit a volume of snow on the 33 miles of streets amounting to 470,000 cu. yds. or 94,000 truck-loads.

White Wing Work — As part of the snow hauling program the regular white wing forces (numbering some 350 men) are assigned to the improvement of conditions in their respective areas throughout the city by stationing sand crews on important hills; clearing snow from crosswalks, catch basins and fire hydrants; and clearing and hauling snow from important intersections, bridges, and other places, to the extent that it is possible with their limited forces

over some 1100 miles of streets. These forces are also supplemented by extra men after the need for labor for supplementing the hauling gangs has been satisfied.

Sanding Program—Sanding equipment proceeds over scheduled routes selected in consideration of the presence of hills and the volume of traffic. In recent years the sanding program has been supplemented by placing 250 sand cans at strategic locations throughout the city for voluntary use. Special sand crews are also stationed on the more critical hills to assist traffic during daylight hours. In addition to scheduled routes, requests for special sanding are responded to as promptly as available forces permit. This request service is maintained 24 hours a day during freezing weather.

In addition to the sanding program of the District Government, the Capital Transit Company operates an equally important sanding program over bus routes. Therefore, the District does not schedule streets on bus routes for sanding by its forces. U. S. Park Service also maintains a force for the sanding of roads within the park area.

Emergency Program—Whenever snow, sleet, or freezing rain is causing slippery or hazardous conditions which may lead to serious traffic congestion, the Director of Vehicles and Traffic is authorized to declare that a state of traffic emergency exists. During the traffic emergency, operators of all vehicles which are not equipped with effective skid chains or effective snow tread tires are subject to arrest if their vehicles stall so as to obstruct traffic on any of 56 main streets in the District. For the guidance of the motoring public, these streets are marked by a broad yellow band painted around street light standards at the beginning of each block.

In the event of a firm forecast of bad weather, the Director of Vehicles and Traffic may request the staggered release of Federal and District employees at a specific time in advance of their regular closing schedule. He may also issue a general warning to motorists that nonessential motor trips be cancelled in view of a forecast of bad weather.

If the Director of Vehicles and Traffic declares a state of traffic emergency, or requests the prerelease of government employees, or issues a general warning to motorists, area police departments, newspapers, radio and television stations are notified immediately so they may inform the public.

Answers to Questions

Q. Why aren't all streets plowed?

A. The plowing of residential streets is undertaken as a secondary program only in outlying areas and in special cases, because there is a serious question of the desirability of plowing the relatively narrow residential streets with parked cars on either side. Doing this frequently creates criticism and demands for hauling snow from around parked cars, driveway entrances and crosswalks. Also, upon the conclusion of the plowing of the 342 miles of arterial streets, most of the equipment operators and other forces are needed for the snow hauling program and are so assigned after a minimum interval of rest.

Q. Why is snow not hauled from all streets, or all plowed streets?

A. To haul snow from the entire 1,100 miles of streets in the city at large would require an expenditure and a program more than thirty times as great as the present program. Snow disposal stations, the supervisory forces, and other facilities would have to be expanded in like proportion. In addition to the expenditure, the number of trucks and labor needed for such increased work would not be available. From this it may be seen why the practice in virtually all large American cities is to remove snow only from congested areas.

Q. Why are automobiles plowed in at the curb and windrows of snow left across driveways?

A. Plowing cannot be stopped whenever a parked automobile is encountered or a driveway is approached. This would leave a windrow of snow greater than the width of the plow extending out into the street causing a traffic obstruction and hazard.

Q. Does the city clean sidewalks, and if not, why?

A. Generally, no sidewalk cleaning is undertaken by the city, with the exception of limited areas in business sections from which snow is scheduled for hauling for accommodations of the general public, from bridges, and from sidewalks cleaned by the U. S. Park Service around public parks and buildings. It is physically impossible for the city to undertake to remove snow from the approximate 2,000 miles of sidewalks in the city.

Q. Why are alleys not plowed?

A. Alleys are not plowed for several reasons. The size of the plowing equipment when fitted with plow blades makes it impossible to negotiate most alleys. Basically, a snow plow is a displacement device and must have a marginal strip along the lane to be plowed to receive the resultant windrow of snow. In alleys there is generally no such space.

Q. Why are refuse collections disrupted during a snow storm?

A. In emergency operations it is essential to have a well-controlled and organized force of experienced men and equipment operators, together with foremen, for prompt and dependable work. The snow program requires the use of the personnel and truck equipment of the Street Cleaning, Refuse, Highway, Sewer, and Water Divisions as the main source of snow fighters; extra men and trucks are engaged as necessary and when available. This is standard practice in all American cities. As soon as possible following the conclusion of snow removal assignments, refuse collection forces are ordered back to collection routes. This requires working overtime, including Saturday and Sunday in order to overcome the disruption in refuse collections.

● **PART of the large fleet of sanding**

Q. Why is salt not used to a greater extent in Washington?

A. Salt (either sodium or calcium chloride) is not used as heavily as in other cities to combat icy conditions in Washington because its use results in the short-circuiting of the underground third rail of the transit system. This material is used, however, on outlying streets sufficiently remote from the underground third rail to assure there will be no trouble.

Q. Why not flush snow and slush into sewers with water?

A. Flushing or hosing of snow and slush off the streets is not attempted because the drainage system of Washington is equipped with trapped catch basins which, being designed to hold solids and prevent their entry into the sewer, (as well as to prevent the escape of sewer gases), quickly fill up with slush and become clogged. Direct sewer inlets exist in some cities, and when temperatures are favorable this method is utilized.

Q. How and where is the removed snow disposed of?

equipment which is supplemented by 250 sand cans placed at strategic locations.

A. By dumping into manholes, some of which have been specially constructed for snow disposal, directly over active, flowing sewers; by dumping into the river; and by dumping on city dumps.

Q. Why are brooms not used for snow removal?

A. Revolving brooms mounted on automotive units are used to some extent in a few cities where a full complement of snow equipment is owned. For very light, dry snows, such as cannot effectively be skinned off by plows, these brooms are of service but their effectiveness depends upon the ability to sweep off the snow before traffic packs it. Consequently, it would be necessary to purchase a large number of such brooms in order to sweep the city's arteries in event of light snowstorms. It is believed that available funds are better applied to the purchase of equipment for heavy storms.

Q. Are streets sanded during a snowfall?

A. Streets are sanded in conjunction with plowing operations. However, during a heavy fall of snow the use of abrasives is not as effective as would be the use of either sodium or calcium chloride.

Q. What is the average number of days that slippery roadway conditions requiring abrasive spreading occur?

A. On an average of 20 days annually.

Q. Why is sand not removed promptly from the streets when icy conditions no longer exist?

A. Thousands of tons of sand (approximately 15,000 tons during the '47-'48 winter) are spread on the streets during the winter and every effort is made to remove the sand as rapidly as possible by the regular street cleaning forces. Because of the large quantities used, however, the winter-time street cleaning frequency coverage is seriously affected.

Q. Why is sand not used over again?

A. Most of the abrasive qualities of the sand are lost after once being used. Also, because of its low cost ($1.30 per ton), there would be little economy in rehandling for this purpose on a large scale.

Q. Why not flush the sand into catch basins with water after it has served its purpose?

A. The sand would cause the catch basins to become clogged and disrupt the drainage system of the city.

Q. How much snow can be expected in Washington?

A. In the past fifty-five years, snow in measurable amounts, has fallen on 509 occasions, or about ten times a year. Of these, there were 163 snow storms of a depth 2 inches and over, averaging about three a year. In some years virtually no snow has fallen and in other years as many as eight heavy storms have occurred.

How The Public Can Cooperate

The task of enabling vehicular and pedestrain traffic to continue moving normally during and after a snow storm has been shown to be a huge one. Even at large and unreasonable expenditure, it cannot be completely accomplished for lack of sufficient equipment and manpower. With the combined effort of all branches of the city forces and such extra equipment and labor as are available, a program has been planned to reduce the effects of light storms and to prevent, if possible, the complete paralysis attendant upon heavy snow. However, the result of the work scheduled to be done is dependent largely upon the cooperation that is received from the general public. Such cooperation is of the utmost importance and can best be achieved by careful observance of the following:

1. In time of snow do not attempt to drive your car without chains or snow-tread tires during the storm. Chaotic conditions usually follow such attempts, in that stranded automobiles in large numbers can effectively block abrasive spreading and/or plowing operations.

2. During periods of snowfall, do not park or allow your car to remain parked on the 56 main arteries (112 miles) designated as emergency streets by a "yellow band" on light standards.

3. A few basic winter driving rules are: Start your car in second or high gear. Accelerate *slowly*. Brake gradually, using a pumping action. Stay well behind the car ahead of you. Drive slowly.

4. Promptly clear a lane along your sidewalk.

5. When cleaning sidewalks or driveways, or digging out "plowed-in" automobiles *do not shovel* snow into gutters or streets where it will block traffic or interfere with subsequent drainage. Pile snow on the curb (in tree box spaces and around trees) or on the front lawn.

6. Snow from private property (gas stations, parking lots, shopping centers, etc.) should be piled on private property.

The preceding questions and answers were prepared and issued by Mr. Xanten as a part of his public relations program.

EQUIPMENT

ALVIN A. APPEL,

Sup't., Sewer Maintenance Division

Los Angeles, Calif.

IT is becoming increasingly apparent that the maintenance, operation and repair of a sewerage and storm drain system is a function of work which must be recognized as a separate utility requiring, when possible, a separate organization of personnel specifically trained and experienced in the performance of the hazardous and obnoxious duties connected with the maintenance of the pipeline systems.

One of the most important services to be rendered by City Governments is the responsibility of constructing and maintaining an adequate sewerage and storm drain system. All too often in the past such systems have been provided, but the personnel needed to properly maintain it have been drawn from other functions of work as needed with the result that a costly installation has deteriorated and must be replaced at greater costs and inconvenience to the paying public.

From the standpoint of safety and good maintenance practices, it is unfair of City Officials to expect or use personnel performing general surface duties to remove stoppages, clean lines, or repair breaks without the proper knowledge of the many dangers involved, or of the laws which regulate safety procedures. Nor are the same officials providing the tax-paying citizens the full value of their money when maintenance work is done only after the stoppage has occurred and considerable damage has resulted to their household effects. Costly law suits are too often the aftermath of such a situation; and they cause, as well, a poor public reaction to the efficiency of the existing administration.

Personnel responsible for performing special functions of work will execute that work more expeditiously and efficiently if provided with the proper tools and equipment. In the case of sewer maintenance, trucks are perhaps the most essential item as they are required to perform a double duty. First, the truck must carry the personnel to the job; and second, it must carry the necessary tools, equipment, and materials which must be used in completing the specific job in the shortest possible time.

In addition to the above functional requirements, trucks in all cases should be as compact as possible, having all small tools and equipment in compartments which can be locked. Sufficient and comfortable space for the carrying of the crew personnel has all too often been overlooked. Many times such equipment is required to operate in heavily travelled roadways and should, therefore, for protective measures be painted a color readily seen some distance away and should be provided with the necessary blinker lights. Neat appearing trucks receive a most favorable reaction from the public as that is a visual indication of the efficiency of any organization. As there are various functions of work to be performed in sewer maintenance, special types of bodies must necessarily be developed to meet the requirements of the job.

The above aims have not been arrived at immediately, but their determination resulted from considerable inspection of other cities' equipment, as well as trial and error through use of the original unit designed. In smaller communities it is to be recognized that a broader view of equipment requirements must be taken in order to match the funds available and result in a unit which will meet the all-around need. However, in the final analysis, the ultimate aim is to provide the most essential tools and efficient equipment to the operating personnel.

Maintenance Equipment

A 1½-ton canopy truck is used in the general inspection and maintenance of the sewerage and storm drain system. The City of Los Angeles now has approximately 4000 miles of main line sewers and 800 miles of storm drains and a continuing inspection of the entire system is carried on as a planned preventive maintenance program. In addition there are 6 four-men crews whose only function is to clean all sizes of sewers by use of sewer balls, cones, drags and buckets. The canopy truck carries $500 worth of equipment such as rods, hose, blower, and other smaller tools needed in maintaining the normal operation of a sewerage system.

● **SPECIAL body, Fig. 1, expedites cleaning of sewers. The truck is painted orange and has a sliding canopy top.**

● **CONSTRUCTION truck, Fig. 2, used by maintenance organization, can tow an air compressor if this is needed.**

● **WITH 75,000 manholes to look after, this truck, Fig. 3, was developed. It has orange stripes; and two-way radio for easy communication.**

for Sewer Maintenance

The newly constituted sewer cleaning crews are now being gradually equipped with a truck shown in Fig. 1 which, with some modification, will replace the open canopy truck. In this new type of body no tools or equipment will be seen or are subject to weather exposure. The sliding canopy will permit working space in the open center way when necessary and will also provide protection for crew personnel if a greater number are needed on a job. As this unit must operate in heavily travelled roadways, it has been painted orange with black striping across the tailgate.

Perhaps one of the most used and efficient pieces of equipment available is our large sewer rodding machine. Such equipment is used daily in removing heavy growths of tree roots or in breaking bad sewer stoppages as a result of industrial waste deposits or grease or sand accumulations. Using a flexible rubber hose rod guide, a set-up can be made quickly and the trouble in the pipeline is soon eliminated. The 500 feet of coiled wire can be rotated going into or reversed out of the pipe. It can also be shoved in or pulled out without rotation. In addition to cleaning sewers, this machine has plenty of power to be used in cleaning culverts, siphons, or catch basin connections. It is also used to thread a rod through a badly clogged sewer in order to pick up a cable used in cleaning sewers with a bucket machine. The cost of rodding sewers with this machine will average around two or three cents a foot.

The sewerage and storm drain systems are in constant need of repair or replacement; therefore construction crews and trucks are perhaps the most important links in the sewer maintenance organization. Fig. 2 shows one of the construction trucks now in use. There are many instances when a compressor is not used, but if one should be required, it can be towed by this unit. The body on this truck is large and sturdy enough to carry considerable materials and equipment. Small tools are housed in closed side compartments and water is carried in a keg to mix small quantities of concrete when water is not readily available. A power take-off will provide power for operating small electric tools, lights, or blowers. The canvas canopy protects the crew members during rains and covers the cement carried in the truck.

Manhole Inspection

With some 75,000 manholes in the sewerage system, it would be impossible properly and adequately to check for the existence of possible explosive conditions except with such a unit as is shown in Figure 3. Some 300 to 500 manholes are checked daily and any indication of explosive condition is reported to and eliminated by the utility suspected. The "sniffing" prod used to insert into the pick hole in the cover is activated by the vacuum from the motor on the truck. The heart of the testing apparatus is a Johnson-Williams Combustible Gas Indicator purchased in Palo Alto, California, Model MV Serial #481, 6-Volts D.C. The gauge indicates natural gas, gasoline, and explosibility and is adjustable for density of mixture. A button on the end of the prod rod is pushed by the operator to obtain a sample of the atmosphere in the manhole. As the truck and crew must constantly operate in heavily travelled roadways, the unit is painted orange with black striping in the rear, and like many of our critical trucks is equipped with a two-way radio telephone.

Our 2200-gallon flushing truck, Fig. 4, is used daily in the flushing of sewer lines having flat grades where deposits are apt to occur. In addition it is also used to flush culverts, catch basin connections, and small storm drains. It is particularly valuable in locations where fire hydrants are not readily accessible. In the rear of the truck is mounted a three-inch pressure pump powered by an auxiliary gas engine which can provide high water pressure when needed for certain flushing operations. Chemicals are sometimes added to the water contents to help eliminate odors in locations where odor complaints have been received. Should it be desired to discharge the full load of water immediately, a quick opening valve on a 12-inch discharge pipe will permit the total load to be released in about 1½ minutes. An elbow attached to the discharge pipe can be turned down when over a manhole so that little water will spill onto the street surface. This unit, like all our equipment which must operate

● **FLUSHING truck, Fig. 4, has 2200-gal. capacity. It is used for flushing and cleaning flat grade sewer lines.**

● **FOR maintaining pumping stations, a special truck, Fig. 5, has been developed. It carries many small tools.**

● **HEAVY-duty repair truck, Fig. 6, has closed compartments and a motor operated winch for lifting heavy equipment or materials needed on the job.**

in traffic, is painted a deep orange with rear stripings.

Appurtenant to the sewerage and storm drain system are 34 sewage and storm water pumping plants, and 5 ventilating stations which are maintained on a regular schedule. All routine work required daily is performed by the Division's electricians and mechanical repairmen. Such crews must carry all necessary tools and material ordinarily needed during the day's work. Should heavier repairs be required, such as the removal of a pump or motor, the heavy repair crew with the crane mounted truck will then be called out. In order to carry such small tools and equipment as required, a special body, Fig. 5, has been developed which has enclosed compartments that can be locked. An open space in the center permits the carrying of any special large equipment needed. The electrician's truck is of similar design except that it has been provided with a sliding canopy to protect valuable electrical equipment carried in the center space. The heavy duty repair truck Fig. 6, is also equipped with closed compartments and has a collapsible crane with a motor powered winch for lifting the heavy equipment. This is an-all purpose truck as it has also been used in many operations relative to pipeline construction and repair.

Of the many hazards involved in sewer maintenance work, perhaps the greatest are 1) the existence of oxygen deficiency; and, 2) noxious gases. As personnel are continuously required to enter sewer manholes or appurtenant structures, the most positive safety factor available is mechanical ventilation prior to entering such structures. When it becomes necessary to inspect large sewers or storm drains, considerable quantities of fresh air must be provided to assure the men working below ground that they are in safe atmosphere. It is always advisable that ventilation of structures be started some time prior to an inspection in order to be assured of complete changes of air. In large sewers a blower of 7500 cfm capacity, Fig. 7, will easily ventilate several blocks. The smaller blower has a capacity of approximately 3500 cfm and can be operated in many locations where the larger unit is impractical. In the operation of blowers care should always be taken that the exhaust is away from the opening being ventilated.

Another important accessory to sewer maintenance operation are good lights both for night work and for interior inspection of larger sewers or drains. The power needed also for the operation of many electric tools is always present when reliable light generators are part of the equipment available. Shown in Fig. 8, the trailer-mounted 5000-watt generator with six floodlights has proven indispensable in night operation as the long cords permit the placing of the floodlights so as to cover completely the entire operation of any job. The smaller generator of 2500-watt capacity provides greater flexibility where lesser power or lights are required.

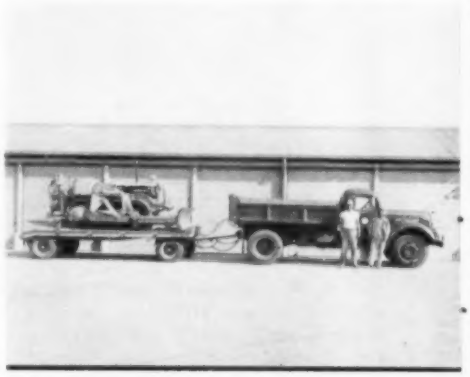
In the City of Los Angeles we have approximately 300 miles of open storm water channels which must be cleaned and maintained yearly. Besides the occasional use of a clam shell, the bulldozer shown in Fig. 9, has proven one of our most useful pieces of equipment in performing this work. As it is often necessary to transport this unit many miles to the location where the work will be done, the trailer and truck have proven invaluable. During periods of heavy storms, the bulldozer has also been used in removing heavy deposits of dirt from the opening or discharge end of drains in order to permit crews to clean the clogged drain. The trailer unit has also been used to carry long and heavy sections of corrugated pipe and other needed material to large jobs.

Besides some of the items of equipment already described, there are other units which are essential to have available when the need demands. A spray unit for the elimination of odors and mosquitoes in catch basins, storm drains, and channels has proved an effective accessory. So has the portable welding unit which can be taken to any job where such work must be done. The large 6000-pound chlorinator and two 350-pound chlorinators have often proven lifesavers when broken sewers have necessitated the by-passing of sewage to storm drains or channels and disinfection of the by-passed liquid is necessary. Compressors, both trailer or truck mounted, and half-bag cement mixers must be included in the essential list of equipment needed in sewer maintenance work.

Recently the Division has been able to equip certain of its most critical trucks with two-way radio telephones operated through a control station in the City Hall. This installation is saving hours of travelling time, as well as manhours, in that supervisory personnel can readily contact and direct the units to the location of complaint. Many favorable comments have been received as a result of the prompt attention given to the complaint thus resulting in better public relations and a reflection as to the efficiency of the operating Division.

● **BLOWER, Fig. 7, will provide ventilation in sewers. Blowers are started in advance of beginning of actual work.**

● **TRAILER-mounted generator, Fig. 8, with six floodlights, is indispensable for the many necessary night-time jobs.**



● **BULLDOZER, Fig. 9, is one of the most useful pieces of equipment in sewer maintenance operations. It is transported on a special trailer.**

NEW TYPE

TRAFFIC SEPARATING BARS

MARK McMILLIN

FOR the past twelve years, engineers of the California Division of Highways have been experimenting with raised traffic bars in an effort to perfect an efficient mix and also a machine that will manufacture the bars and extrude them on the spot. Plant mix had not proven entirely satisfactory because of the difficulty of placing and maintaining the asphaltic concrete bars.

In 1946, a San Francisco inventor, John E. Perry, brought to the District IV State Highway office some samples of a fibre concrete which he had developed. He discussed with Blair Geddes, District III Traffic Engineer, its advantage for use in the manufacture of raised traffic bars. Although the product weighed only 50 pounds per cubic foot, it developed high tensile and compressive strengths. The question was: could it be used effectively in traffic bars?

To test the new material, bars were cast in the district shops, and trial installations were made. These proved initially satisfactory and four more years of experimentation followed. A proper cementing agent had been found; also a paint that would bond to the material; and the curl of the bar had to be eliminated. By close cooperation between State Highway engineers and the inventor, all these problems were successfully solved, and the Division of Highways adopted an "in lieu" specification allowing these precast bars to be substituted for the three-inch high asphaltic concrete bar covered in its Standard Specifications. However, since the fibre concrete bar was precast by the extrusion method, the question naturally arose: why couldn't the bar be extruded on the spot, thus saving the added expense of hauling and placing the bars?

During 1951 a pilot model of the necessary on-the-spot machine was constructed, and a new material mix was devised—one that could be extruded and would harden quickly. In 1952, the set-up was tried out and proved so successful that, with minor improvements, it has been in operation ever since. The machine is truck-mounted and proportions the dry material and water into a rotating paddle-mixing chamber. A pump at the bottom of the mixing chamber, electrically-controlled by the forming carriage operator, delivers the material through a plastic hose to the casting shoe. The material control to the mixing chamber is connected to the discharge pump, and the mixing chamber receives material only when the pump is actually discharging.

Photos courtesy California Division of Highways.

● **HOW the process goes—a general view of the procedure of placing the stripe.**

Materials used for making the bars consist of white Monterey sand, white cement, and an additive developed by the inventor. By changing this additive, the setting time for the mixture can be varied from fifteen minutes to four hours.

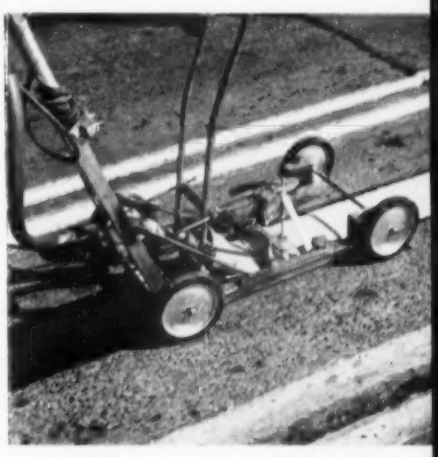
On the first installation, a mix with a one-hour setting time was used. The installation consisted of 404 feet of raised bar, varying in length from a minimum of two feet to a maximum of twelve feet per bar. The greatest number of bars were from two to four feet in length, with a few from four feet to twelve feet in length.

Casting Operation

The actual operation of casting the bars required only 42 minutes. The entire installation, including laying out and cleaning up afterward, required less than four hours' time with a crew of seven men. Later, this time was cut substantially when the casting carriage was developed to incorporate mechanical end-forming of the bars and also spray application of the cementing agent in place of hand mopping.

The new system of laying traffic bars has lowered maintenance costs very substantially. The first year of operation, recently completed, indicates that the maintenance cost is only a fraction of the cost of maintaining asphaltic concrete bars made and laid according to the former method.

Still another advantage of the new-type traffic bars is the elimination of inconvenience to the motoring public. A complete raised-bar channelization can now be installed, during the lighter traffic period of the day, between the morning and evening peaks, and it can then be turned over to full use within an hour after completion. And all this is accomplished without the use of protective barricades, warning lights or flares, or other barriers to traffic.



● **CLOSE-UP of casting carriage in operation and placing the line.**

MAKING METER BOX TILE

FIBER meter tile forms are a new approach to meter box tile. With them, we have been making our own concrete boxes for six months, and have found the process simple and inexpensive. Because we were the first small plant to utilize this new idea, we feel that our experiences with the product may be of interest to readers of *Public Works*.

When, a year ago, in Yardley, we began to install meters in our approximately 1100 services, it soon became evident that a good fraction of the meters would have to be installed at the curb line. We needed 18 x 36-in pipe, but obtaining less than carload quantities of it proved to be an obstacle—at least in Yardley. We then wrote to a manufacturer of steel forms. He quoted us prices on an 18 x 18-in. form and added that he was experimenting with a new way of casting meter box tile. The new method was fiber forms. Would we care to try it out?

We did, and this is the story.

The fiber form comes folded flat in two pieces. When open, it makes two cylindrical waxed tubes which become the outer form and the inner form. To stiffen the inner form, three steel rings are inserted into it; the outer form needs only pressure from the wet concrete to force it out nicely. With two centering rings to keep the two parts of the form concentric, a uniform wall thickness is assured. After the form is set up and placed in position for casting, a filling collar and plate is inserted into the upper end of the form.

Equipment Is Simple

Our materials for operation consist of only one filling collar and plate and a dozen sets of rings. This equipment is used over and over, and we can make one tile daily for each set of rings. The investment for this equipment was modest.

For the concrete mix, we use two parts gravel, two parts sharp sand, and one part cement. We had a little difficulty at first from trying to use too large gravel; now we specify that it must pass a ½-inch screen.

We prepare the concrete in a small electric driven dumping mixer which makes enough mix for filling two forms. Water content is important; the mix should be wet enough to pour smoothly into the form but dry enough so no puddles of water will form on the top. It takes only a little experimentation; and we found that "spanking" the sides of the outer form tends to settle the mixture. After the filling collar and plate are removed, the top of the wet tile is troweled smooth.

Under normal temperature conditions, the tile can be upended and the rings removed the next day. After about a week, it can be moved and used safely.

We have enjoyed several advantages since adopting these "Singleuse" forms. With the meter box tile in two pieces, it is much easier to handle. Actually the 18 x 18-in. piece weighs about 130 pounds as against a standard weight of 350 pounds for the full length as manufactured. The apparent discrepancy is accounted for by the fact that the home made tile is a lighter gauge, which we find is quite strong enough for our meter settings.

The fact that the forms can be cut to any length with a hand saw is valuable where grade adjustments are concerned. We make up odd lengths of tile for this purpose frequently—particularly in the new development areas which do not have an established curb grade. In grade adjustments, especially, we find that stacking two tiles for each setting pays off. Where the meter cover must be lowered a few inches we dig down only half way, remove the 18-in. long section and insert a shorter one. Where the cover must be raised, we simply remove the cover and attach a short piece of the correct length. Before, when we used the standard length section, regrading was a more expensive problem.

As nearly as we can estimate, these tile cost us about 40 per cent less than we paid for the manufactured sections. Actually the tile is made up when we wouldn't be doing much anyway—in bad weather, when outside work is unavailable, or on days when it is too late to start a new job but early enough to cast a few tile. We believe our home made tiles have been a success, even apart from the saving angle. They are convenient to use, involve no stocking problem, and—most appreciated by the men, they are comparatively light and easy to handle.

1 To make concrete barrels with Fiberforms the only requirements are reinforcing and centering rings, filling plate and collar.

2 The outer ring is placed over one end of outer form and form is snapped out against the ring, making a round fiber tube.

3 The outer form, with ring in place is now ready to turn over. In filling, pressure of concrete tends to round out contour of the form.

in FIBER FORMS

ALLEN J. BRUMBAUGH,
Superintendent, The Yardley (Pa.), Water & Power Company

4 The two plain inner rings are inserted into the inner form, one about at the middle and the other about one-fourth the way down.

7 The filling plate is pressed into the top of the inner form and the filling collar is placed in the top of the outer form.

10 Completed barrel needs no wetting or protection and should be hard enough to turn over in 24 hours, and all rings removed.

5 The bottom inner ring, with centering bar, is pressed into the form and set about one inch from what becomes the bottom end.

8 Wet concrete is dumped on the plate, shoved into the space between the forms, and tamped or puddled to make a solid fill.

11 Within a few days, with careful handling, the barrel can be used. The fiber forms can be removed or left on as desired.

6 The forms are held concentric by the centering pin of the outer ring entering the hole in the bar of the inner ring.

9 If notched barrels are desired, blocks can be inserted into the wet concrete after filling plate and collar have been removed.

12 The finished barrel shown as it will be used. Forms are in 15", 18" & 20" diameters and in 15", 18" & 24" lengths.

HEATING
Provides BUILT-IN Safety for
EXPRESSWAY RAMPS

LEO F. DeMARSH,
Project Manager of the Central Artery Project
Massachusetts Department of Public Works

THE installation of radiant heating systems in the ramp pavements of the John F. Fitzgerald Expressway (commonly called the Boston Central Artery) is probably one of the largest projects of its kind in the world. I should like to point out, however, that since radiant heating cannot compete economically with conventional methods for snow removal it is not installed in the ramps primarily for this purpose, but rather to keep pavements skid-free and safe during the winter months.

In a city with regular street patterns of long rectangular blocks, parallel ramps could be designed to permit a smooth transition between city street and an expressway. The need for snow melting systems under such favorable conditions might not be so apparent. This, however, is not the case in Boston, which is noted for its extremely irregular street pattern. It is said, perhaps facetiously, that this was set many years ago by the meanderings of cows. Because of this difficut street arrangement and the desire to minimize heavy property damages, ramps in many cases were designed to meet city streets nearly at right angles with a short turning radius connecting the ramp and the surface street. The geometry of this type of connection does not give the most desirable transition and it was decided, in view of the icy New England winters, that the ramps should be heated to keep them free of snow and ice. These heated on-ramps will furnish sure traction for vehicles making the slow turn from street to the ascending grade and the heated off-ramps will provide safe braking areas on the descending grade so that vehicles will not skid into surface traffic. The snow and ice-free ramps will help to minimize accident hazards and traffic tie-ups.

Each ramp is 28 feet in width and 600 to 700 feet in length; but only the lower portion, varying from 300 to 400 feet in length, will be heated. This portion consists of a 9-inch cement concrete slab covered with a 2½-inch riding surface of bituminous concrete. The slab rests on earth fill contained between concrete retaining walls. The upper portion of the ramps are of steel viaduct construction and consequently cannot be economically heated. If heating systems were provided on the steel structure, the addition of insulation and an increased slab thickness would add a dead load of about 55 pounds per square foot, which would result in a considerable increase in cost of the structure.

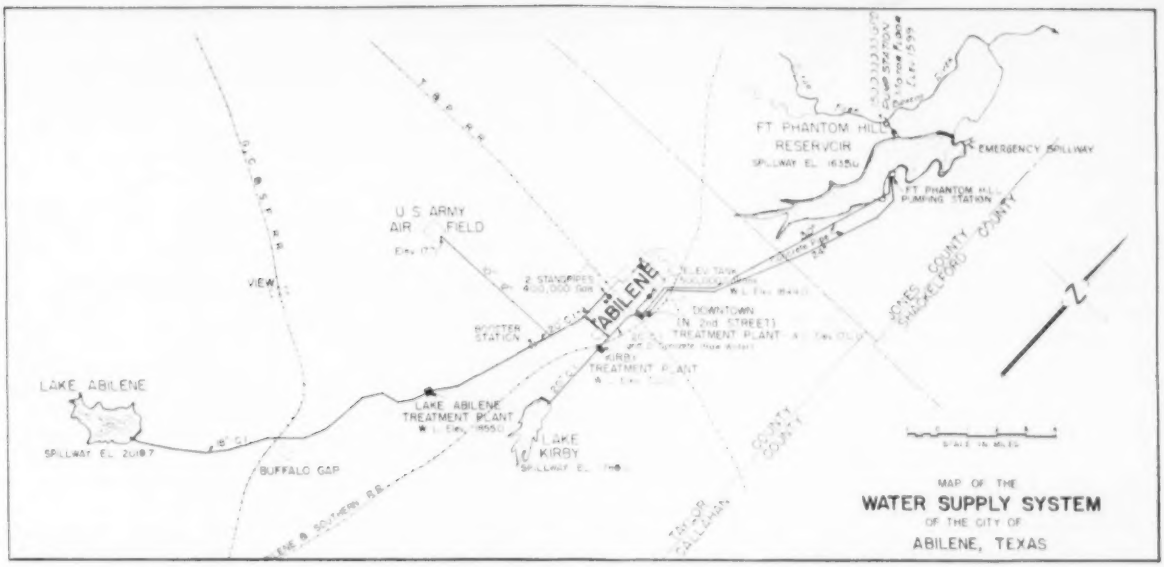
The heating grids, embedded in the concrete slab, consist of one-inch wrought iron pipes welded into two-inch headers. These grids will be shop-fabricated and transported to the ramps where they will be set in position and welded together to form a sinuous coil. Field work, by this method, will be held at a minimum.

The system operates by circulating a warm solution of water and ethylene glycol through the pipe grids embedded in the pavement slab. The circulating fluid is heated in a converter which uses, as its source of heat supply, steam piped from existing underground steam mains of the local power company. If it were not for the proximity of these underground mains to the ramps, it is questionable whether the heating systems could economically be installed. The cost of constructing long steam distributing

(*Continued on page* 137)

● **PICTURE** below shows concrete roadway in the rear, and a pipe grid and reinforcing in the foreground.

● **BEFORE** placing the concrete paving: the piping grids are in place, but not all sections are connected.



● MAP shows Abilene's water supply components. New pumping station and connecting line in upper right.

FLOOD WATERS PUMPED TO REINFORCE Reservoir Supplies

GUY BROWNING ARTHUR

ABILENE is on the flat plains of West Texas, with 55,000 inhabitants and growing rapidly. It needs water. There is no broad river flowing nearby. Nor any mountain range to hold rain and snow, and generate swift streams which can be turned into reservoirs. There is no subterranean source from which water can be pumped. The wind blows across from Oklahoma to Mexico with nothing to stop it. When the ground dries it dries right straight down.

To make matters worse they've had a drouth for the last 10 years, said by a scientist to be one of the six worst drouths in 700 years. The normal rainfall is 23 ins., but it has averaged only 13 ins. for ten years, and two of the ten were normal, so some of the other years were dry as dust. The last drouth within the memory of people now living here was in 1886. People moved out. Their stock died of thirst.

But it won't go that way this time, for they have found a way to hold what water comes from the sky, their only source: rain water. The city now owns 10,000 acres of watershed, from which it has a revenue of $22,564 from cattlemen who rent it for grazing. But this is not the big revenue. The pay-off is the water which floods over the land during rains. It fills three "lakes."

A lake on the plains is a super "tank." A tank is a depression which a rancher enlarges by bulldozing dirt from the bottom to form a high dike around the deepest end of the hole.

Abilene has three lakes on its 10,000 acres of watershed. These are: Ft. Phantom, 3950 acres, 55 ft. deep, 24 billion gallons capacity, built in 1949 and with a watershed of 324 sq. miles. Kirby, with an area of 808 acres, a depth of 28 ft., a capacity of 2.85 billion gallons, built in 1928 and draining an area of 44 sq. miles. And Abilene, 653 acres in area, 36 ft. deep, 3.25 billion gallons capacity, built in 1921 and with a watershed area of 110 sq. miles.

These lakes can be coupled in various ways, for they are all on the one major watershed. As shown on the map, Abilene and Kirby are higher than the treatment plant in town, and higher than Lake Ft. Phantom, from which the major part of the city supply is drawn. An 18-in. cast iron line takes water from Lake Abilene, a 20-in. cast iron line comes from Lake Kirby, and two concrete lines, 24 and 30-inch, lead to the downtown filtration plant from the pumping station at Lake Ft. Phantom. These two lines are served by three pumps, 4, 6, and 12-mgd, supplying 8 mgd to the rebuilt filtration plant.

But that is not enough water. The draw-down on Lake Ft. Phantom was cutting under the safe line of expected new supply. And the population trend keeps right on up the scale. Every town in West Texas has that to worry about. One place has a population of 36,000 today, increased six times from less than 6,000 ten years ago. If Abilene should be hit by a sudden spurt of growth it would be in serious trouble were it not for the new measures that have been taken to impound more water.

These new measures are proving to be most effective. About 12 miles north of Abilene there is a point on the Clear Fork of the Brazos River where all the water from three counties pours down together through a gap. The watershed covers 1400 square miles, larger than Rhode Island. The normal runoff is estimated at 25,000,000 gallons per day. All of this water had been "going by" for years.

In May, 1952, the city completed a new pumping station costing $518,-937 and a low dam across Clear Fork. The engineers were Freese & Nichols, and the contractor was Harry Campbell, both of Ft. Worth. This takes water from Clear Fork and pumps into Ft. Phantom Lake.

The principal equipment consists of three identical 50 mgd Byron-Jackson vertical pumps, able to handle 150 mgd together. They are driven by Elliott direct-connected motors made in Ridgway, Pennsylvania, and equipped with switchgear made by Allis-Chalmers, with Limitorque controls.

Each of the pump pits is protected by a screen built into the concrete wall of the pump house, and the small sticks and other debris floated off the watershed are held outside. This debris is not heavy or dangerous, like that coming down a stream, and there is only a small amount to be cleaned from the bars after a flood.

One of the problems in the operation of this station is to determine when pumping should start after storm water begins to flow from the watershed. Important factors are involved. The first is evaporation, which concentrates gypsum and salt on the land. Evaporation on these plains takes 5 vertical feet of water per year.

During the summer when hot winds blow over these lakes, whitecaps form on the water and then disappear into the air. The water, diluted with air, is taken up by the wind. It is easy to see how the land surface becomes encrusted with harmful salts, and it is cheaper to let the first runoff from the rains wash these salts down the Fork than to precipitate them in a treatment plant.

Another element to be washed off is whatever remains of the effluent of the sewage disposal plant after it has been spread thinly over nearby grazing land. Except during rains, this effluent is sterilized by the sun sufficiently to make it harmless. It enriches the grazing land and makes better grass, and it is not considered detrimental to the rain water after the first flushing.

The alkalinity of the water is checked automatically by a Speedomax Control unit made by Leeds & Northrup. It is assumed that when the akalinity has dropped to a safe limit, all other undesirable material has been washed off. The pumps are turned on as needed to take the water coming into the pool behind the low dam.

A 66-in. steel pipe pierces the high ridge which separates Clear Fork and the pumping station from Lake Ft. Phantom. The pumps do not work every day, and not often all day long except during floods. They may work only two hours on some days. From May, 1952, to November, 1953, more than 3,000,000,-000 gallons were pumped through the conduit into the lake, raising the level of the lake about one foot. It is estimated that the entire supply for Abilene took only this extra water from the new pumping station. The normal volume of the lakes is thus conserved for any period of low rainfall on the watershed.

How the pumps can operate only at times, and for only a few hours at a time, may cause some wonder. Over a watershed of 1400 square miles rain may fall at a distance with none in sight nearby. Often there will be a rush of water into the pool when the sky is clear overhead. Automatic control of the pumps makes it possible to take the water as it comes down from these distant rains.

The new pumping station had been in operation 20 months at the end of 1953, and has proved its value. From here on a supply of water is assured, and further measures to be taken to conserve more of the flood water will raise the level of Lake Ft. Phantom well above any predictable dangerous draw-down for city supply.

L. A. Grimes, Water Superintendent, retired at the end of 1953 after 32 years of service, at his own request. He did not want to quit work entirely, so he has charge of the filtration plant, with certain accommodations provided by the city in token of appreciation of his excellent administration. C. C. Harlan, who has been here three years, succeeded him. M. M. Anderson is city engineer, working closely with the water department on all its development problems.

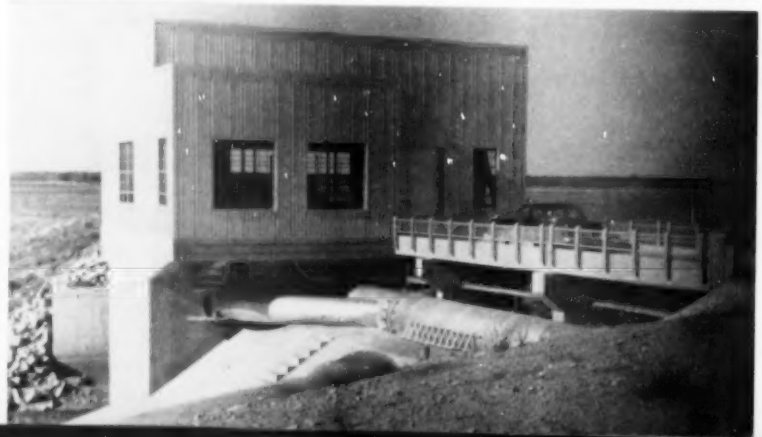
A program of development and expansion is already under way. The downtown filtration plant was enlarged and improved last year at a cost of $674,750, bringing its capacity up to 16 mgd normal, or 20 mgd maximum. A new elevated storage tank was built at this plant with a capacity of 250,000 gallons for filter wash water. Water coming to the filtration plant is prechlorinated and post-chlorinated, at the rate of about 3 ppm.

In the last four years 73 miles of new mains and service pipe have been laid, bringing the total up to 180 miles. This is not keeping pace with the growth of the city, and the rate must be increased. This in turn calls for re-examination of the plan of major supply lines. As of January 1, the department had 15,-398 accounts, all on meters.

Recent legislation stops the return of profits from the Water Department to the general fund, and from now on the profits will be applied to new construction and expansion. It now becomes possible to attack the water service problem as a whole, and do whatever is required step by step on a long-time plan.

One of the items in this program is the building of retention dams on the Ft. Phantom watershed, to hold back water behind these dams and release it as the pumps can handle it. At present, while the new pumping station is performing as expected, too much water is "going by" during heavy rains. Not all of it can be held for Abilene, for there are some commitments for towns farther down the Fork, but a great deal more can be pumped out of the runoff when it is high. This will raise the level of Lake Ft. Phantom still higher, and insure a still greater reserve supply for the future demands of the city.

● **PUMPING station on Clear Fork of Brazos adds 150 MGD to Lake Ft. Phantom.**



CHEMICAL WEED KILLERS *Improve* DITCH MAINTENANCE

● WHERE the chemical weed-killer test plot stops. Growth beyond shows what would have happened without it.

WM. D. HOGAN,
Technical Representative,
E. I. du Pont de Nemours & Co., (Inc.)

While basic sanitation, especially drainage, has always been fundamental in mosquito control, there has been the constant hope that sooner or later a perfect larvicide or insecticide or some other "cide" would be found; but resistant species develop instead. Hardly any mosquito control program can be based wholly on such chemicals.

As mosquito control officials turn back to drainage, they face other problems, some old and some new. Not the least is the current cost of labor for keeping weeds out of drainage ditches by the old shovel-and-scrape method. Worse than that, shovel-and-scrape weed control soon cuts away enough elevation to affect the flow of water. In the mangrove swamps of Florida, natural vegetation contributes an additional problem—the mangrove foliage grows so thick that it is often impossible to penetrate to the surface of the water with a larvicide application either from the ground or the air.

Take Pinellas County, Florida, for instance. If you look at a Florida map, you can see that Pinellas County is the tongue of low-lying land which is occupied by the resort cities of Clearwater and St. Petersburg. The highest point in the county is only 25 feet above sea level, and water from the Gulf of Mexico on one side and Tampa Bay on the other nearly meets in the mangrove swamps in the middle of the county. At high tide some of the interior swamps and pools are lower than the sea outside. All this moisture, plus the famous Florida sunshine and warm weather, make natural vegetation grow with jungle-like vigor. Weeds, grass, and mangroves clog the drainage ditches as fast as they can be dug away.

Last year A. L. Lafferty, in charge of county mosquito control, started experimenting with chemical weed killers to control weeds, grass and mangrove sprouts in the ditches. For drainage ditch work, Mr. Lafferty sought a compound which would keep ditch bottoms free of vegetation for a long time. Yet toxicity to wildlife and fish had to be considered, and he wanted something that would go a long way in small doses, so heavy sprayers and supply trucks wouldn't have to make many trips over the spongy land and through the mangrove jungle.

Herbert Friedman of Southern Mill Creek Products Company, Inc., suggested "Telvar" W weed killer, and made some trial applications. This firm specializes in custom application of this material. First test applications were made in July, 1953, and grass control was thorough enough for free-flowing drainage for about 11 months. In test applications made in December, 1953, control of weeds and grasses was still excellent long after spring growth had started.

In one of the test applications, there was no water in the ditch, and both the sprayed and unsprayed ditch were graded with shovels before chemical treatment. By early April, grass had begun to grow back in the ditch that had not been chemically treated, but the treated ditch remained virtually free of grass.

In another ditch, test applications of "Telvar" W were made when there was about 10 inches of water standing in the ditch. Grass control here was impressive, but not as satisfactory as in the dry ditch.

Where mangroves grow thick around pools and along ditches, stems and roots pack together so tightly that the soil itself is hardly visible—and where you cut them down to the ground, they resprout twice as thick. To scrape roots and all out of the ditch bottoms means

● THIS is how much you have to remove to clean out mangrove growth.

● TREATED with weed killer after cleaning; no growth in 4 months.

deepening the ditch by three or four inches at each cut.

Where mangroves have grown to full height, with normal foliage, one thorough spraying with "Ammate" weed and brush killer will kill both tops and roots. This is all right for advance treatment in swamp areas where larvicide applications are scheduled. But by the time mangroves put out enough leaves for foliage spraying along a ditch, the ditch may be hopelessly clogged. So for this job, Mr. Lafferty has tried a combination of cutting plus chemicals with good results. The large mangroves are cut down to the ground with brush scythes and axes. Then, during the winter dormant season, the stump bases and the young mangrove sprouts are sprayed with a mixture of 2,4,5,-T ester in diesel oil.

Results can be seen in early spring. Untreated stumps and sprouts are tough and flexible—and many are beginning to put out new shoots. The treated stems and young sprouts are dead and snap easily between the fingers.

Success with chemical weed and brush killers in mosquito control areas is leading Florida mosquito control authorities, county engineers, and other public works officials to consider widespread use of these materials to cut the cost of drainage district operation—and do a better job too.

● **TREATED ditch in foreground; the ditch in background was not treated.**

Prefabricated Bridges Reduce Replacement Costs

A PROBLEM posed by the cost of replacing many small bridges in South Carolina has been lessened by the use of pre-fabricated reinforced concrete bridges furnished and delivered to bridge sites by contractors on the basis of competitive bids. This procedure was described generally in an article in the March, 1954, issue of Public Works. Supplementary data, presented below is from South Carolina's "Carolina Highways."

About five years ago the Highway Department began using pre-fabricated bridges to fill the need for low-cost crossings at small streams and swamps. During the first years of their use, the bridges were cast and erected by Department maintenance forces.

This year a new approach has been tried in furnishing the bridge units. On two separate occasions, competitive bids have been received and contracts awarded for furnishing the bridges and delivering them to the site of erection. Highway Department forces still undertake the erection of the units. The pre-fabricated method of bridge construction greatly reduced the cost of small bridges, but having the component parts cast under contract has reduced it still further.

● **CRANE is placing curb sections of precast concrete bridge. Trailer at far right is loaded with slab sections. Site is in Orangeburg County.**

Cost Data

Bids for the bridges were first opened in January of this year, and Carolina Concrete Pipe Company, Inc., of Columbia, received a contract for furnishing 728 feet of bridges at an average cost of about $37 per foot. All units involved in this letting were designated as an H-10 design, the lighter loading capacity of two standard pre-cast designs used by the Department. The heavier type is known as an H-15 design.

In April, bids were received for an additional 2,618 feet of the bridges comprising 39 complete units. Experience gained by having cast the first lot permitted Carolina Concrete Pipe Company again to submit the lowest bid, this time at an average price of $30 per foot. The reduction in cost of approximately $7 per foot in the second letting was especially gratifying because the latter contract called for four bridges of the heavier H-15 design. Lengths of the assemblies in this letting ranged from 14 to 196 feet and were all a standard 24 feet wide.

Several factors in addition to the lower cost of the bridges make them desirable for application to the highway system. Because they are constructed in sections, the bridges can be moved to other sites if the roads on which they were first erected are relocated. If the structures are damaged or destroyed in part, any desired section can readily be replaced. Also, the pre-fabricated units can be erected and opened to traffic within a matter of a day or two, whereas bridges constructed on the site may require months to complete.

APWA News

AMERICAN PUBLIC WORKS ASSOCIATION
1313 EAST 60th STREET, CHICAGO 37, ILLINOIS

New England Public Works Conference Organized as New Chapter

Over 200 Public Works Officials attended the charter meeting of the New England Public Works Conference at Brookline, Massachusetts, June 23rd. The Conference, held at the new Brookline incinerator, afforded an excellent opportunity to inspect the operations of this modern disposal facility which includes an attractive auditorium and serves also as Civil Defense headquarters for the community. Featured speakers were Harrison P. Eddy, Jr., Partner of Metcalf and Eddy, and supervisor of design and construction of the Brookline incinerator, who discussed "The Design and Construction of Municipal Incinerators", and Isidor Richmond, the Architect of the new incinerator, whose topic was "Incinerators—Machines of Beauty". Mr. Richmond's architectural firm recently received the 1954 Award of Merit of the American Institute of Architects for their design of the Brookline installation. Carl Schneider, Consulting Engineer from New Orleans, Louisiana also gave a very informative talk entitled "Factors In Planning Refuse Collection".

Edward Dane, Chairman of the Board of Selectmen cordially welcomed the large gathering of Public Works Officials from Maine, New Hampshire, Connecticut, Rhode Island and Massachusetts to the Town of Brookline. The conferees were treated to a wonderful luncheon by the Town of Brookline and heard Allan H. Rogers, Superintendent of Public Works of Garden City, New York and Immediate Past President of the APWA compliment the group for organizing their new Chapter and pointed out how it can benefit the public works officials in that area.

● **BROOKLINE incinerator, above; and below, speakers at the New England meeting.**

President
Milton Offner

Vice-Presidents
Ralph C. Graham Edward P. Decher
W. A. Coolidge Kenneth King

Past President
Allan H. Rogers

Directors
George G. Hyland Albert G. Wyler
Jean L. Vincenz Frederick Crane

Treasurer
Charles W. Darling

Executive Director
Donald F. Herrick

A slate of officers were elected following the adoption of the chapter's by-laws. Walter A. Devine, Town Engineer and Superintendent of Public Works of Brookline, Massachusetts was named President. Other officers elected were: Charles W. Cooke, Director of Public Works, Hartford, Connecticut, Vice-President; Howard F. Carpenter, Chief of Sanitation, Providence, Rhode Island, Secretary-Treasurer; Wesley E. Haynes, Superintendent of Public Works, Concord, New Hampshire; George J. Maher, Director, Department of Public Works, Lewiston, Maine and Thurman Dix, Director of Public Works, Barre, Vermont were elected to serve as members of the Chapter's Executive Committee.

Soil Cement Specification Being Revised

The Association's Standard Specification H—"Soil Cement Roads and Streets", is now being revised by a Committee composed of J. A. Leadabrand, Manager, Soil Cement Bureau, Portland Cement Association, Chicago, Illinois, Chairman; D. T. Grider, Superintendent of Public Works, Columbus, Georgia; R. L. Oldham, Office Engineer, Hasie and Green, Consulting Engineers, Lubbock, Texas; C. L. Watkins, Director of Public Works, Alexandria, Virginia; H. F. MacKay, City Engineer, Wheaton, Illinois and Alden K. Fogg, City Engineer, San Diego, California. The revised specification is expected to be published soon.

Michigan Chapter Holds Its First Annual Conference

One-Day Conference at Michigan State College Presents Ideas on a Wide Variety of Public Works Subjects

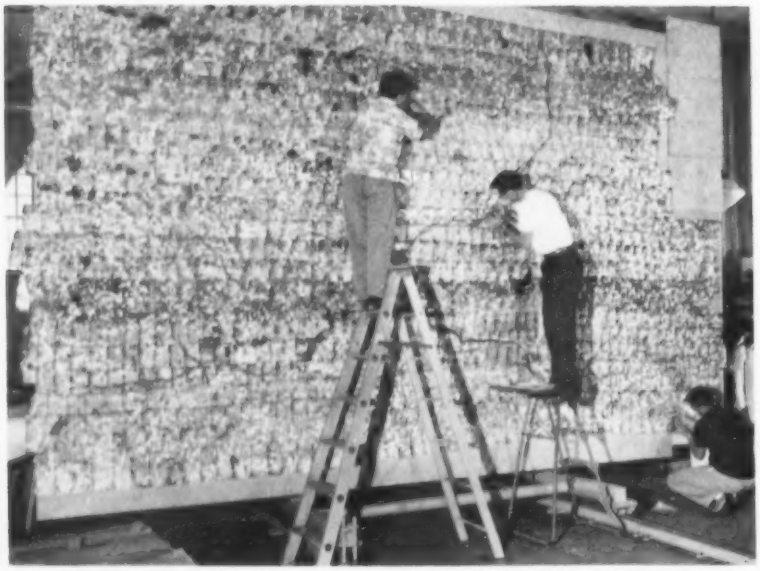
Michigan State College at East Lansing, was the site of the First Annual Michigan Public Works Conference sponsored by the Michigan Chapter of the APWA. The one-day Conference held July 1, was conducted in cooperation with the College's Civil Engineering Department and Continuing Education Service. John Ryder, Dean of Engineering at MSC welcomed the group to the campus at the opening session. Harry R. Steidmann, Superintendent of Municipal Equipment of Milwaukee was the first speaker. His talk on "Equipment Management" provoked considerable discussion which resulted in the appointment of a Chapter Committee to investigate the possibility of developing an equipment operators training program.

William Danielsen, Manager of the Municipal Personnel Service of the Michigan Municipal League presented a very interesting paper entitled: "Factors To Consider In Establishing Salaries For Public Works Engineers and Administrator". J. G. Schaub, Special Assignment Engineer who is in charge of the Local Government Section of the Michigan State Highway Department discussed certain aspects of the State's modern highway law, adopted in 1951, which should be reconsidered by the Legislature's 1954 Highway Study Committee.

"Cost Accounting and Performance Budgeting" was the subject of a very interesting paper presented by G. M. Morris, Field Representative of the Public Administration Service in Chicago. Mr. Morris explained that his organization is now in the process of preparing a Public Works Cost Accounting Manual in cooperation with a Committee of the APWA. Robert G. Sarvis, Director of Public Works, Cincinnati, Ohio spoke on the timely subject of—"Regulating Utility Uses of Streets". Information contained in his paper will be incorporated in a Special Report on that subject which will soon be published by the Association. The Conferees also heard John R. Snell, Head of the Civil Engineering Department of Michigan State College discuss composting developments and then viewed the experimental plant which is in operation on the campus.

Louis Moehr, City Engineer of Wyandotte and President of the Michigan Chapter was honored by being selected as the Chapter's nominee for the Charles Walter Nichols Award for his work in developing a highly efficient landfill operation in his community. The guest speaker at the banquet was James W. Follin, Director, Division of Slum Clearance and Urban Redevelopment, Housing and Home Finance Agency, Washington, D. C. who pointed out how the urban renewal program offers a challenge to the public works officials.

Air Mapping Completed for Kent County, Michigan



● **LABORATORY technicians assembling 1824 aerial photographs of Kent County, Michigan, to make a new map of the 864 square mile area. Grand Rapids, principal city in the area, appears in the section between the tops of the ladders.**

Mapping of the entire 864 sq. miles of Kent County, Mich., by aerial photography has been completed, according to Otto Hess, Engineer Manager of the county. This mapping provides the most complete data available since 1933, when the county was previously air-mapped. The project involved taking 1824 pictures, taken in pairs so that when viewed with a stereoscope they give a three-dimensional view of the terrain and of growths and structures. The work was done by Abrams Aerial Survey Corp. of Lansing, which reports that aerial mapping work for the first three months of 1954 is twice as great as for the similar three months of 1953—a testimonial to the growing recognition of the value of such surveys for coordinated planning of nearly all kinds of public works projects.

Chapters Elect New Officers

The New Orleans, Minnesota and Northern California Chapters elected new slates of officers at their June meetings. The new officers elected for the 1954-55 term are as follows:

New Orleans

President: Charles Cassagne, Jr., Administrative Engineer, Railroad Terminal Board, New Orleans, La.

Vice-President: Robert Grehan, Roadway Engineer, New Orleans Public Service Inc., New Orleans, La.

Board Member At Large: Clarence Palm, Assistant to Superintendent, New Orleans Public Service Inc., New Orleans, La.

Board Member At Large: Stuart H. Brehm, Jr., Assistant City Planner, City Planning and Zoning Commission, New Orleans, La.

Secretary-Treasurer: Kenneth M. King, Traffic Engineer, New Orleans, La.

Minnesota

President: J. H. Rough, City Engineer, Virginia, Minnesota.

Vice-President: C. E. Dahlgren, City Engineer, St. Peter, Minnesota.

Secretary-Treasurer: Sidney Mitchell, City Manager, Edina, Minnesota.

Northern California

President: Richard F. Lovejoy, Director of Public Works, San Leandro, Calif.

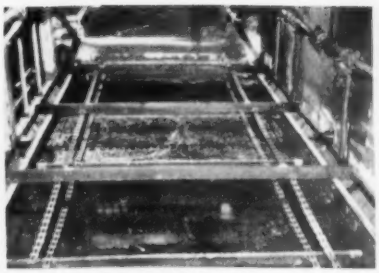
Vice-President: John A. Morin, City Engineer, Oakland, Calif.

Secretary-Treasurer: John L. Kergel, Right of Way Utilities Engineer, State Division of Highways, San Francisco, California.

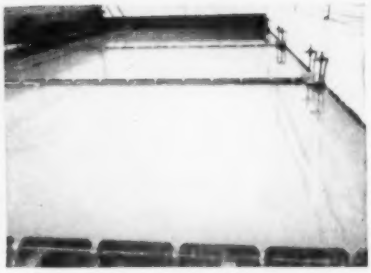
Convention Notes

Be sure to read the announcement on page 47 of this issue for information on the 1954 Public Works Congress and Equipment Show to be held at Atlantic City, September 19th to 22nd.

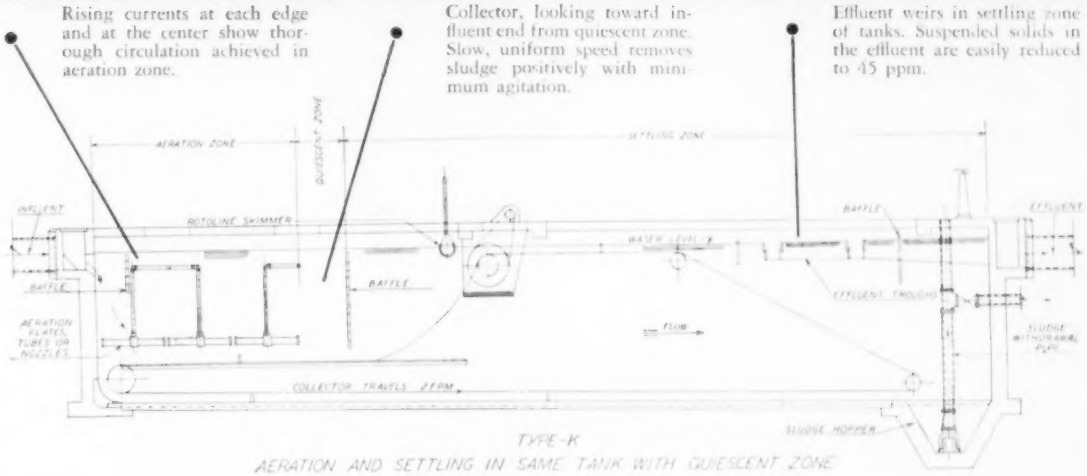
Rising currents at each edge and at the center show thorough circulation achieved in aeration zone.



Collector, looking toward influent end from quiescent zone. Slow, uniform speed removes sludge positively with minimum agitation.



Effluent weirs in settling zone of tanks. Suspended solids in the effluent are easily reduced to 45 ppm.



TYPE-K
AERATION AND SETTLING IN SAME TANK WITH QUIESCENT ZONE AFTER AERATION AND SLUDGE HOPPER AT EFFLUENT END

NOW! More effective, lower cost pre-aeration of sewage or waste

New LINK-BELT system combines pre-aeration and settling in a single tank

NOT only does the new Link-Belt pre-aeration system cut construction costs by eliminating separate tanks and their connecting piping — it also improves settling tank efficiencies. Violent aeration to prevent settling of heavy solids in aeration zone is unnecessary because they're collected along with the sludge in the settling zone. This, of course, ends the messy job of draining and cleaning the aeration tank manually.

Using only the correct volume of air produces a more gentle agitation. This increases flocculation . . . helps release more entrained gases . . . improves suspended solids settling rate . . . steps up B.O.D. removal. Even when chemicals are added to the sewage, proper mixing rate for maximum flocculation can be used. Sedimentation in aeration zone will not be a problem.

What's more, separated grease is removed immediately in the settling zone by the skimming action of the sludge collector. It is not re-mixed with the sewage in passing from the aeration zone to the settling zone.

For complete information on pre-aeration and other efficient equipment in the broad Link-Belt line, call the Link-Belt office near you. An experienced sanitary engineer — working with you, your chemists and consultants — will help you get the finest in modern sewage, water or industrial waste treatment equipment. 13.342

LINK-BELT

SANITARY ENGINEERING EQUIPMENT

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices in Principal Cities.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

TWO PIECE

sliding or screw type cast iron valve boxes for covering 4" through 10" valves for water or gas. Rugged construction for lifetime service. 5¼" shaft. Extensions as required.

Adjustable VALVE BOXES

THREE PIECE

valve boxes supplied with separate bases are available in sliding or screw type. Made with 5¼" and 7" shafts with extensions as required. Complete line of service and roadway Boxes.

General Sales Offices

ANNISTON, ALABAMA

We Invite Inquiries to Our Nearest Sales Office

120 S. Michigan Ave. Chicago, Illinois — 250 Fifth Avenue New York 1, New York

ALABAMA PIPE CO ANNISTON ALABAMA APCO

FOR QUICKER, SURER LOCATIONS EVERYTIME

THE *New* AQUA VALVE BOX LOCATOR

New engineering design, perfected after two years of research and now built into the AQUA at no additional cost to you MEANS ABSOLUTE MINIMUM OF NEEDLE-SPINNING ACTION!

YOUR NAME IN GOLD FREE!

It's Magic! The new Aqua Extra Conductor development . . . an exclusive in the location instrument field!

$29.50 F.O.B. CINCINNATI

SEND NO MONEY! Try AQUA for 15 days — you be the judge.

". . . greatly improved . . . no needle nervousness . . . pinpoint accuracy. The new Aqua has our unqualified approval!"

W. F. Becker, Chief Inspector
The Ohio Fuel Gas Co. Columbus, Ohio

Literature on request — address Dept. PW

AQUA SURVEY & INSTRUMENT CO.
2519 LESLIE AVE. . CINCINNATI 12, OHIO

Washington news

Presented in cooperation with the American Public Works Association and through the courtesy of the Washington Office of the American Municipal Association.

Public Works Important Part of Housing Act of 1954

THE Housing Act of 1954 (H. R. 7839) has passed both Houses of Congress. Following is a brief explanation of these provisions:

I. *Loans for Public Works*: Section 903 of the bill restores the Federal program to loan money to municipalities for public works, if financial assistance "is not otherwise available on reasonable terms". This AMA-sponsored provision of the Act sets up a revolving fund of $50 million in the Housing and Home Finance Agency to aid in financing projects under municipal law by purchasing the securities and obligations or making loans to states, municipalities and political subdivisions of states. No loans or security purchases will be for a period longer than 40 years. The Secretary of the Treasury is authorized to fix the interest rate "taking into consideration the current average rate on outstanding interest-bearing marketable public debt obligations of the U. S. of comparable maturities". The authorization runs to June 30, 1957.

II. *Loans for Advance Planning*: Title VII, Section 702 authorizes resumption of the interest-free loan program for advance planning of public works. A $10 million fund is authorized to encourage municipalities to maintain a continuing reserve of planned public works, construction of which can be commenced rapidly should economic conditions warrant it. The loans are available to aid in financing the cost of engineering and architectural surveys, designs, plans, working drawings, specifications or other action preliminary to and in preparation for public works construction. Loans are repayable when construction commences. The projects for which advance planning loans are requested must be part of an approved overall, State, Local or regional plan.

III. *Urban Planning for Small Communities*: Title VII, Section 701 authorizes a $5 million fund to make planning grants to State Planning Agencies for planning assistance to municipalities having less than 25,000 in population. Similar grants are authorized for metropolitan or regional planning agencies. Grants are to be matched 50-50 by State appropriations for surveys, land use studies, urban renewal plans, technical services and other planning work, but excluding plans for specific public works.

Water Pollution Appropriation

The House of Representatives has approved an appropriation of $3.295 million for the U. S. Department of Health, Education and Welfare's work in engineering, sanitation and industrial hygiene. Of this amount, about $1 million is appropriated for the work of the water pollution control division. This represents about the same amount as available last year, except that the House tacked a rider on the bill providing that $270,000 of the $1 million must be used to complete the fourth floor of the Robert A. Taft Sanitary Engineering Center in Cincinnati. Once again, as it always has in the past, the House Appropriations Committee refused to implement the provisions of the Water Pollution Control Act by providing funds for loans to construct sewage treatment plants or grants to plan such construction. No appropriations for this purpose have ever been made by the Congress.

Slum Clearance Construction

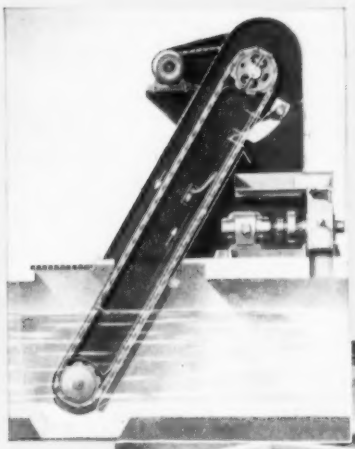
Redevelopment of 52 slum areas in 32 cities for which Federal loans and grants had been approved is expected to result in a construction outlay estimated at almost $500 million. These 52 areas constitute about

we treat them all like

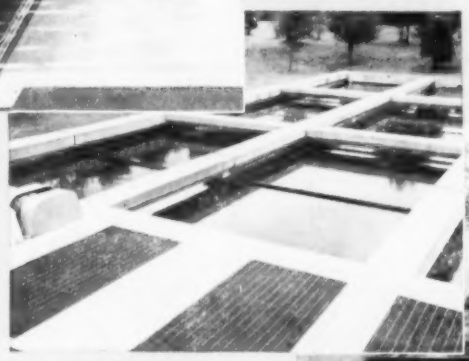
finger prints!

Just as no two sets of finger prints are ever alike, so, too, are all sewage and waste treatment problems *different.* Velocities, head loss, capacities, site conditions, tank or chamber hydraulic conditions, and many other factors vary from plant to plant. That is why we at Chain Belt have no standard answer to a treatment problem. We study each application carefully, and from our broad background of experience recommend the type and size of equipment you need for most efficient, economical results. From the broad range of Chain Belt Sewage and Waste Treatment Equipment, we select the exact units that can be best adapted to your particular conditions.

So, don't just specify equipment. Ask your nearest Rex Sales Engineer to work with you to assure the results you want, or write direct to Chain Belt Company, 4722 W. Greenfield Ave., Milwaukee 1, Wis.



Rex Mechanical Cleaned Bar Screens and Triturators



Rex Vertl-Flo® Clarifiers

Rex Conveyor Sludge Collectors

Rex Grit Collectors

CHAIN BELT COMPANY

District Sales Offices in all principal cities

Need more facts about advertised products? Mail your Readers' Service card now.

one-third of the 154 slum areas that are in or near actual development stage of local slum clearance and urban redevelopment programs.

A breakdown of the estimated $497 million outlay by type of construction shows: $271.3 million for housing ($257.7 million for private housing; $13.6 million for public housing); $53.5 million for commercial construction; $48.0 million for industrial construction; $107.7 million for public and semi-public construction; $16.7 million for site improvements.

Well advanced are 154 projects in 103 localities. Approvals for preliminary planning and survey activities were in effect for an additional 71 localities. Thus, planning advances or loan and grant contracts had been approved for slum clearance projects in 179 localities. Some 45 other cities were holding capital grant reservations as an indication of their intention to initiate a local Title I program. This makes a total of 224 localities where work on one or more Title I projects is either under way or contemplated. Two-thirds of these have populations of under 100,000.

Capital grant reservations for the participating localities now total $246 million, or approximately one-half of the $500 million authorized by the Act.

Federal Aid to Airports

On June 8, President Eisenhower sent a formal request for $22 million to the Congress to reactivate the Federal-aid airport program. The program was placed in the deep freeze last year while the new Administration reappraised the "appropriate Federal role in airport construction". The President's transmittal message said, "As a result of a review by the Department of Commerce, it has been decided to continue Federal participation with State and local governments in such airport construction projects as will clearly serve the national interest in air safety and movement of air traffic". Chances for passage of the appropriation and reactivation of the program are favorable.

Public Divided on Proposal for Public Works Program Says Gallup Poll

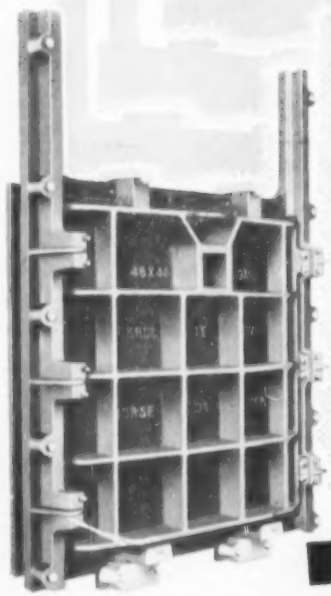
Public Works made the Gallup Poll this month. George Gallup's American Institute of Public Opinion survey on whether the Federal Government should start a big public works program now found the Nation's voters lining up in two camps of equal strength: 44% want a big public works program started now to cut down on unemployment; on the other hand, another 44% disagree; and 12% have no opinion.

• • •

English Research on Sewage and Industrial Waste Treatment

WORK has been continued by the British Dep't of Scientific and Industrial Research on biological filtration of sewage, utilizing different rates of revolution of the distributors. Settled sewage was applied at an average rate of about 150 gals. per cu. yd. per day (gyd) of medium. From 6 am to 2 pm, the rate was 75 gyd; from 2 pm to 10 pm it was 225 gyd; and from 10 pm to 6 am it was 150 gyd. With rates of revolution of 1 to 5 minutes, according to the rate of flow of sewage, results were not as good as were obtained with rates of 30 to 55 minutes per revolution. BOD of the applied (settled) sewage ranged from 221 to 250 ppm. From Sept., 1952, to April, 1953, the filters with the more slowly revolving distrib-

Pekrul Grows



To keep pace with the ever increasing demand for PEKRUL GATES over half a century, MORSE BROS. MACHINERY has just completed an extensive modernization program. The installation of many new machines and facilities, an increased engineering staff, and complete, new, custom re-tooling specifically for PEKRUL GATE production means...

modern design and superior engineering service...

even faster PEKRUL GATE deliveries to you...

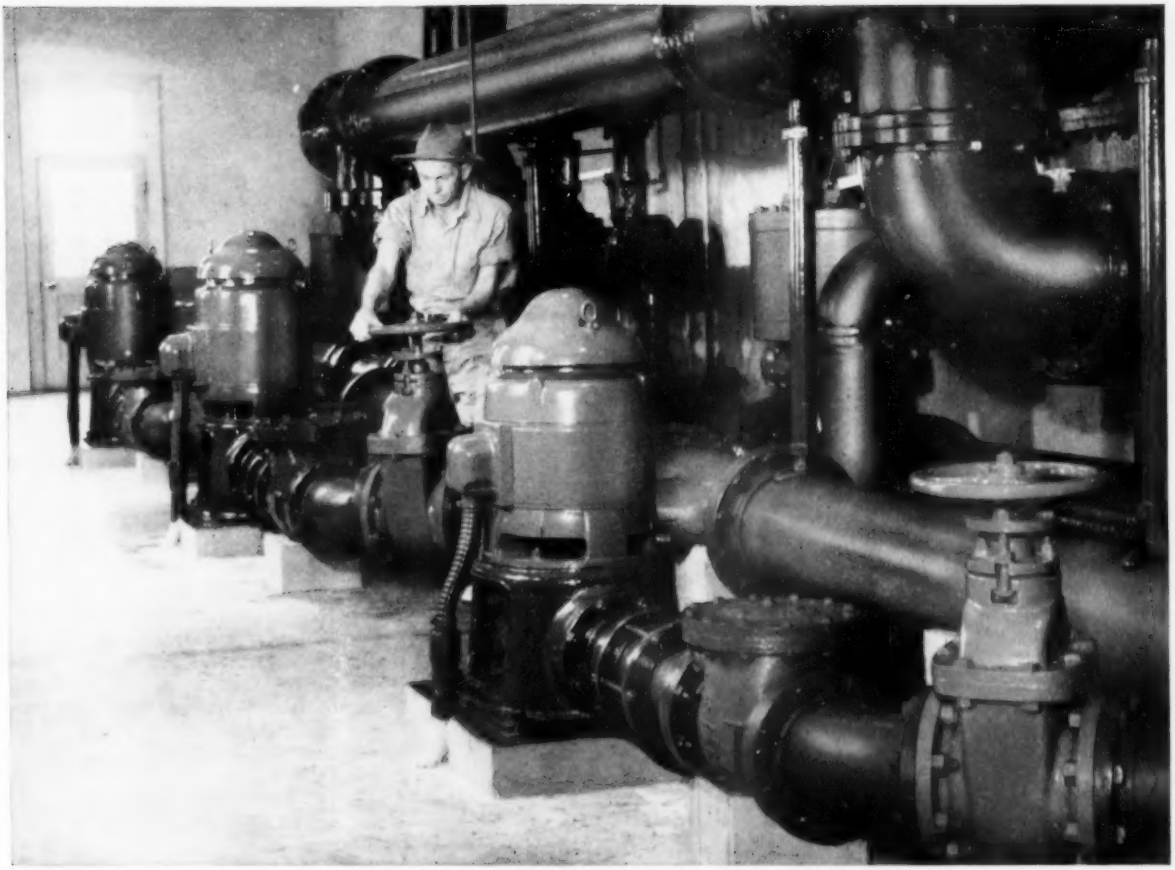
PEKRUL GATE DIVISION

MORSE BROS. MACHINERY
DENVER, COLORADO

MANUFACTURERS OF PEKRUL GATES FOR

Flood Control · Sewage Disposal · Rearing Ponds · Recreation Pools
Levees · Reservoirs · Irrigation · Cooling Towers · Pumping Plants
Water Works · Oil Refineries · Steel Mills · Dams · Fish Hatcheries

Thousands use our Readers' Service card to keep up to date... do you?



THREE WORTHINGTON VERTICAL TURBINE PUMPS lift water 66 feet in the dual-purpose water treatment plant in Pulaski, Virginia.

Pulaski's new plant softens hard water, hardens soft water

Seems that the main source of water for Pulaski, Virginia, is a small impounding reservoir where the water is extremely soft.

When the reservoir runs low, Pulaski draws from a limestone spring. Water here is unusually hard.

To deliver water of uniform quality all year 'round, the Pulaski plant has to soften the hard water — and harden the soft water.

Pumps for this unique plant were supplied by Worthington. Three Worthington vertical turbine units transfer water from the plant's clear well to the general distribution system. Pulaski's engineers are well pleased with the Worthingtons because they take up so little floor space and need no priming facilities or foot valves. The three pumps are installed in a 16-foot deep clear well and lift water 66 feet at exceptionally high pumping efficiencies.

Why not learn how the modern Worthington vertical turbine pump can help in your operation? Write for free Bulletin W-450-B40 to Worthington Corporation, Vertical Turbine Pump Division, Harrison, New Jersey. D.4.28

WORTHINGTON

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

CENTRIFUGAL • ROTARY • STEAM • POWER • VERTICAL TURBINE

CONSERVE GROUND WATER—IT IS A VALUABLE RESOURCE

Now's the time to mail this month's Readers' Service card.

utors produced an effluent with a lower BOD and a considerably higher concentration of oxidized nitrogen. However, a still further reduction in speed of the slower moving distributors resulted in a deterioration of the effluent. It was concluded that best results were obtained with a rate of rotation of a 4-arm distributor of one revolution in 15 to 30 minutes.

In another experiment, distributors applying 360 gyd of settled sewage to small-scale filters were operated at ¼ minute per revolution, at 2 mins., at 11 minutes and at 26 minutes. Best results were obtained with the distributors making one revolution in 2 or 11 minutes. With an applied sewage having 248 ppm BOD, the paper-filtered effluent BOD for the filters were 16.9 ppm for the ¼-min. rate; 13.8 ppm for the 2-min.; 14.5 ppm for the 11 min.; and 31.2 for the 26-min.

In still another experiment, using a smooth gravel medium, graded 1½ to 3-inch, settled sewage was applied at rates of 200 to 2,000 gyd, using a pendulum distributor. At first the backward and forward movement was once in 4 minutes; later this was changed to once in 8 mins. In the colder months of the year, there was little difference in efficiency; but in the warmer months, the 8-min. dosing cycle gave significantly better results and less ponding occurred.

Effluents From Silage

In order to determine the strength of the wastes from silos, the Department observed two silos during 1952 and 1953. Both contained Meadow Fescue-Clover mixtures. One silo contained 12.2 tons of unchopped grass with a dry solids content of 17.8 percent; and the second contained 21.3 tons of chopped grass with a dry content of 19.6 percent. From the first silo, drainage amounted to 678 gallons; from the second 614 gals. These figures represented 30 percent and 16 percent, respectively, of the total contained moisture. The total polluting matter discharged from the first silo containing 12.2 tons of unchopped grass was equivalent to 372 lbs. of BOD, or 30.4 lbs. per ton of silage. BOD averaged in excess of 50,000 ppm. About half of the discharge occurred during the first two weeks of storage.

Treatment Data for Photographic Wastes

The problems of treating wastes from places where there is large scale development of films and printing of the resulting pictures were also investigated by the Department. Waste water from such developing and printing establishments comprise spent solutions of developer, spent solutions from the fixing of prints, and much larger volumes of waste water. The spent solutions contain thiosulphates and compounds of silver, but in some places the liquid is treated for the recovery of the silver, which can be reused with the addition of fresh thiosulphate. The spent developer is usually alkaline and contains various organic reducing agents.

At two establishments where investigations were carried on, there were procedures for the recovery of the silver, and the waste to be treated included only spent developer and wash water. There were small sewage treatment works at both establishments. If the photographic wastes were treated with the sewage, the wastes being about 30 percent of the total flow, the amount of the spent developer would be about 0.8 percent of the total flow. With this concentration of developer, treatment was found to be feasible on a trickling filter, though

●TENNANT Sweeper cleans 48" path; replaces 3 to 12-man crew.

New Compact Machine Sweeps Gutters Walks and Alleys at 1/5 Usual Cost

BY SWEEPING congested areas with a new type power sweeper instead of pushbrooms, Akron, Cleveland and several other cities may save up to 80% this year in labor costs.

The new sweeper, shown at the APWA meeting in New Orleans last fall, is a compact heavy-duty machine. It cleans a 48" path and turns easily in a 5-ft. radius.

Its sweeping capacity is reported to equal that of a 3 to 12-man pushbroom crew.

Sweeps Cleaner Than a Crew

The sweeper has a powerful brush-and-vacuum system which eliminates need for water spraying or "wetting down." A rotating curb-brush sweeps leaves, dust and litter into main path of the machine.

A 36" brush, in a vacuumized compartment, throws dirt forward into an enclosed 9 cu. ft. hopper. Sweeping speed, with 2-speed transmission, is 1½ to 8 MPH.

Pays For Itself In 6 Months

The new sweeper has proved most successful in "mechanizing" whitewing work in special congested areas where big sweepers can't be used—such as gutters in downtown areas, walks, alleys, garages, driveways, etc.

In such areas a single machine is said to pay for itself in 1 to 6 months.

Air terminals, auditoriums, piers and parking lots also can be swept most economically this way.

For details, please write or wire to the G. H. TENNANT CO., 2578 N. 2nd St., Minneapolis 11, Minnesota.

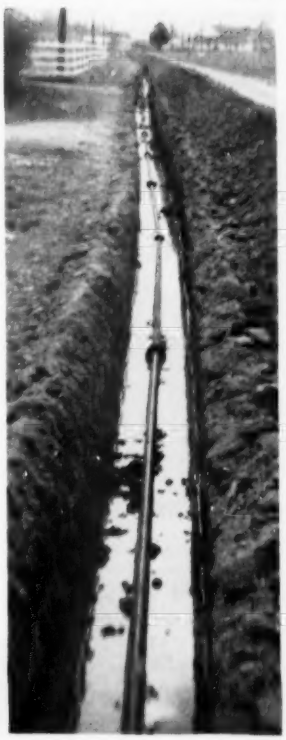
It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

Boltite Mechanical Joint

McWane 2¼" Cast Iron Pipe has been taken into the DeLavaud Centrifugal family. Mechanical Joint pipe 2¼" in diameter is now being cast centrifugally by McWane. After extensive research and experiments, we have recently completed construction of the only centrifugal small-pipe foundry in the United States producing Mechanical Joint Super-DeLavaud 2¼" Cast Iron Pipe in EIGHTEEN-FOOT lengths.

McWane-Pacific small diameter pipe has all the characteristics of Super-DeLavaud larger size pipe—smooth straight barrel, even cross section, sound metal free of blow-holes or casting defects, easy to tap or cut.

DeLavaud centrifugal casting of pipe in 4" sizes and up has been in successful operation for over 25 years. McWane's new Super-DeLavaud small pipe foundry probably is the most important development in the pipe industry since the invention of centrifugal casting.



McWane-Pacific 2¼" Cast Iron Pipe in 18-foot lengths is furnished with Mechanical joint and with complete line of fittings. Later, it will be made with bell-and-spigot joints and also in 2-inch diameter. The 2¼" size weighs approximately 6.8 lbs. per foot. It is easily handled and laid by two men. It is furnished uncoated, coated or cement lined. For complete information, wire or write McWANE CAST IRON PIPE COMPANY, Birmingham, Alabama, or PACIFIC STATES CAST IRON PIPE COMPANY, Provo, Utah. (Sales Offices in principal cities.)

McWANE PACIFIC PIPE *Lasts for Centuries*

Get full details of this month's products . . . mail your Readers' Service card today.

Kill the ROOTS and you kill the WEEDS!

NEW DOLGE N P WEED-KILLER

—Can be used with confidence by anyone. Kills *all* vegetation by contact and translocation to weed roots; sterilizes the soil. RESULTS APPARENT IN A FEW DAYS. Spray, sprinkle or use as dry powder—"built-in" wetting and spreading agent works *fast* by wetting waxy surfaces of plants and inducing penetration into leaves, stems, roots. Non-inflammable, non-volatile, non-corrosive.

DOLGE SS WEED-KILLER

—Where NO vegetation is desired . . . on walks, drives, areas close to buildings. Tends to sterilize the soil so that wind-blown seeds cannot germinate.

DOLGE E. W. T. 40- 2, 4-D SELECTIVE WEED-KILLER

—*Will not harm good lawn grasses, but kills dandelions, plaintain and other broad-leaved noxious plants in turf.*

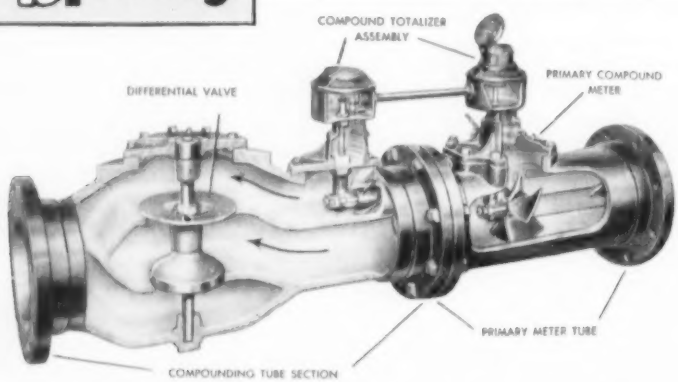
Write for Dolge booklet on chemical weed control, and see your DOLGE SERVICE MAN for practical weed control advice.

Ask about **SOLEXTO** Kills grubs of turf insects —one application protects lawns for years!

dependable DOLGE

WESTPORT, CONNECTICUT

Sparling WATER CONTROL EQUIPMENT



COMPOUNDS for Flow-Ranges as Wide as 1 to 125

The standard 6-inch Sparling Meter accurately registers flows from 90 gpm to over 900 gpm. To read flows as low as 15 gpm on a 6-inch main, install the SPARLING Compound Meter shown above. Sizes 6-inch to 36-inch.

Bulletin 313 and quotations are yours for the asking

SPARLING METER COMPANY

LOS ANGELES 54 . . . . . Box 3277
CHICAGO 8 . . . . 1500 South Western Avenue
BOSTON 8 . . . . . 6 Beacon Street
DALLAS 1 . . . . 726 Reserve Loan Life Bldg.
KANSAS CITY 6, MO. 6 E. Eleventh Street
626 Broadway . . . . . CINCINNATI 2
101 Park Avenue . . . . . NEW YORK 17
1932 First Avenue . . . . . SEATTLE 1
66 Luckie Street NW . . . . . ATLANTA 3
85 Industrial Street . . . . SAN FRANCISCO 24
3330 Forbes Street . . . . . PITTSBURGH 13

Need more facts about advertised products? Mail your Readers' Service card now.

the quality of the effluent was affected. In the test, small filters were used and the runs were continued for about two months. With an application of 60 gyd, the following results were obtained: With 70 percent sewage, 29.2 percent of tap water and 0.8 percent of spent developer, the applied BOD averaged 197 ppm and the pH was 8.7 to 8.9; effluent BOD averaged 13 ppm and pH 8.3 to 8.5. With 70 percent of sewage, 28.4 percent of tap water and 1.6 percent of spent developer, applied BOD averaged 328 ppm and the pH 8.9 to 9.4; effluent averaged 43 ppm BOD and 8.5 to 8.9 pH.

The sewage containing 0.8 percent of the developer appeared more alkaline than was desirable and it was thought that better results might have been obtained by neutralization before treatment. The permanganate value of the effluent was high, averaging 56 ppm, compared to 188 in the applied mixture. However, it was thought that in most cases treatment of the wastes with sewage was feasible, especially where the proportion of photographic wastes is not high. It was stated that "the effect of the developer on the treatment of the sewage is relatively small and there should not be any great difficulty if comparatively small volumes of such a solution were discharged to the domestic sewers of a town."

Radio-Isotope Removal by Normal Water Treatment

Investigations were made by the Director of Water Pollution Research on the removal of strontium 89 and 90, ruthenium 106 and cerium 144 by methods of water treatment. It was found that treatment with coagulants did not remove more than about 5 percent of the strontium; even heavy treatment with ferric sulphate did not produce removal in excess of 10 percent. When the water was softened by adding calcium hydroxide followed by sodium carbonate, in amounts approximately equal to the temporary and permanent hardness respectively, from 60 to 75 percent of the active strontium was removed. This amount was largely independent of the relative proportions of temporary and permanent hardness and of the concentration of inactive strontium in the water.

Using a synthetic tap water with a total hardness of 300 ppm calcium carbonate hardness, to which was added 0.54 ppm inactive strontium, the proportion of removal of radiostrontium increased linearly with the proportion of hardness removed

by the addition of lime. The maximum removal when the water was completely softened was about 80 percent.

A large proportion of radio-strontium was removed by base-exchange softening, using sulphonated coal, a synthetic alumino-silicate and a synthetic resin. Removal in the first softening cycle was 99 percent; in later tests this did not fall below 97 percent removal. This work was done with small columns. Using a commercial water softener, about 96.7 percent removal was obtained. Almost complete removal was obtained at first by passing the water through slow sand filters, but after continuous use for 14 days, the filters failed to remove any appreciable amount of the strontium.

• • •

The City Traffic Muddle — What Exit?

Harry A. Barnes, Director of Traffic, Baltimore, Md., presented this paper at the Fifth Highway Transportation Congress, NHUC. As published here, the text is slightly condensed.

NO one can quarrel with the fact that every city in the country needs modern freeways and expressways. There is no argument either that every city needs a great many separations of streets at congested intersections. It is also a known fact every city needs much more off-street parking. The only problem is, how long will it take to acquire these needed items and, can we afford just to sit back and wait until they are completed? It might be well to consider, also, whether or not, even if expressways, freeways and off-street parking facilities are acquired, will they fully solve our traffic problems; or must we still rely on our existing local street systems?

In visiting various cities throughout the country such as Seattle, Los Angeles, Boston, Detroit and others, I have found that their new freeway systems do a terrific job of moving large volumes of traffic at relatively high speeds from the suburban areas of the city to the central business districts. Insofar as they go, this is good and the facilities have been well-planned. However, in studying the result of such freeway developments, it is quite apparent that, except for part of the problem, they do not offer a solution. It would appear that a great portion, perhaps as much as 70%, of our cities' traffic will still be carried on our existing streets.

When I went to Denver in 1947, I was informed that the city was one of narrow streets which really were of no value as a solution to the traffic problem. Nothing could be done, I was told, until freeways could be built. It is rather interesting, therefore, to note that if any success was had at Denver, this success was gained almost entirely through the use of existing thoroughfares. It is true that in Denver the "Valley Highway" is being constructed. This particular highway will be eleven miles long and has been under construction about four years and will require another three years for completion. Inasmuch as that highway was not completed during my 5½ years in that city, obviously existing streets had to be used entirely.

It is really amazing what can be done, even with a 34-ft. street, measured from curb to curb, if a traffic official is permitted to put his imagination and technical tools to work. Many cases in Denver can be noted where thoroughfares which normally carried almost no traffic, after having the parking removed from one side, a one-way

HIGH QUALITY WATER ★ LOW INSTALLATION COST ★ MINIMUM OPERATING ATTENTION

ACCELAPAK
(Trade-Mark)
water plant
is the answer

"ACCELAPAK" equipment makes "custom plant" water quality available with "standard package" convenience and economy for . . .
- Small communities
- Camps and resorts
- Estates
- Industrial plants, etc.

"ACCELAPAK" Water Plant includes:
- ACCELATOR® clarifier or softener
- Slurry feeder for pulverized limestone or hydrated lime
- NEUSOL® feeder for coagulant (and hypochlorite when needed)
- Filter – gravity or pressure
- Other components as required

Capacities: 15 g.p.m. to 250 g.p.m. and up

▶ *for full details*

on how the "ACCELAPAK" plant can provide you with high quality water, treated at a cost well within the budget, send this coupon now.

INFILCO

Field offices in 33 principal cities in the U. S., Canada and Mexico

☐ Please send me Bulletin 1a70-P.
☐ Please have an INFILCO representative contact me regarding "ACCELAPAK" treating equipment.

INFILCO Inc., P.O. Box 5033, Tucson, Arizona
NAME
TITLE
COMPANY
ADDRESS
CITY ZONE STATE

Thousands use our Readers' Service card to keep up to date . . . do you?

street movement installed, and a modern system of flexible traffic controls completed, could then carry a peak hour volume of from 1500 to 2000 cars. This did not occur in just one or two isolated instances, but in a great many.

I do not believe that cities can merely sit back and wait for necessary money, plans and time to construct modern roadways. In fact, they must begin solving the problem today by utilizing every single thing that is available to the engineer. He must squeeze the last ounce out of existing thoroughfares.

This can be done—first, through the use of modern traffic control systems. These may entail such things as traffic actuated controllers, ranging all the way from a semi-actuated control to a full traffic density control system. Many of these must be interconnected and coordinated through the use of electronic cycle selector control.

Secondly, a system of "through" streets will have to be instituted and protected by stop signs, and certainly greater use of one-way movements will be mandatory.

Third, people of all cities must decide whether they want to move freely in their communities, unimpaired by congestion, or whether the privilege of parking one's car on a street at any point the driver may desire is of more importance individually than the needs of perhaps hundreds of thousands of people.

Fourth, merchants must realize that people will not drive their cars to an area of business if the routes are congested, if there are accident-prone intersections enroute, and if it is difficult to circulate throughout an area once they arrive.

One thing we can be sure of also is that if existing streets are made more efficient today, we will be doing much to prepare the way for the expressways and freeways of the future. This can be done to a point that when such facilities are completed, we will have a complete street and highway system so integrated that *all* traffic needs will be adequately taken care of.

• • •

Lighting and Traffic Control in Rhode Island

Rhode Island operates the following "Stop-and-Go" traffic signals on State highways: 1 full-actuated, with speed control; 50 full-actuated; 7 semi-actuated; 8 fixed time; and one pedestrian signal of this type. Modern street lighting units are provided at five rotary traffic circles, using 37 sets of units; and there are three installations of overhead neon signs.

In most cases the new lights are of the mercury vapor type. Being a cool-burning light, this type is less expensive to operate and provides more illumination than the sodium vapor or incandescent types. Floodights are also gradually being replaced with modern lights.

Reflectorized traffic paints (beads-in) is being used exclusively and have proved very satisfactory, both from the standpoint of durability and of reflectivity during the hours of darkness. There has been some experimenting with red "Stop" signs, but these have not been in use long enough to judge their value. However, it is felt that there will be more observance of these new signs on the part of motorists. It has been the experience in Rhode Island that, for a time at least, a new kind of traffic sign attracts the attention of the average driver and he exercises more caution than with a standard sign which has been in use for a long time.

NOW'S THE TIME! PREPARE
FOR SNOW STORMS . . . BUY
BUFFALO STEEL
"Quick-Set" SNOW FENCE POSTS
Designed for quick, easy, one-man driving in any type of soil, Buffalo Steel Snow Fence Posts provide faster erecting of all types of snow fences. Holes are punched in flanged channel posts on 5 or 10" centers to simplify attaching of fencing. Studded tee posts make possible quick, secure "tie-on" of fence to posts.
You look years ahead with Buffalo Steel "Quick-Set" Snow Fence Posts because they are used and reused from winter to winter, indefinitely.
Buffalo Steel "Quick-Set" Snow Fence Posts are available in any desired length to meet your exact requirements and are made of heavy-duty, high strength Rail Steel.
STANDARDIZE ON BUFFALO STEEL "QUICK-SET" SIGN POSTS
Check these reasons why you should specify Buffalo Steel Sign Posts:
Holes punched 1" or 2" apart for quick, bolting of road signs and route markers
Easy, one-man driving
No holes to dig
No concrete required
Specially coated with long-life, baked-on paint
Accepted standard with hundreds of municipal, county and state engineers
Write for Catalog TODAY and have complete information at your finger tips for stocking Buffalo Steel "Quick-Set" Snow Fence Posts and Sign Posts.
BUFFALO STEEL DIVISION
H. K. PORTER COMPANY, INC.
TONAWANDA, NEW YORK
Now's the time to mail this month's Readers' Service card.

WHO CAN PREDICT when these fair weather fans will break loose and flood your highways? When these homeward bound hoards deluge your intersections, traffic signal controls must respond and adjust immediately to prevent traffic jams. Heavily burdened highways deserve, and must get more of a share of the green light.

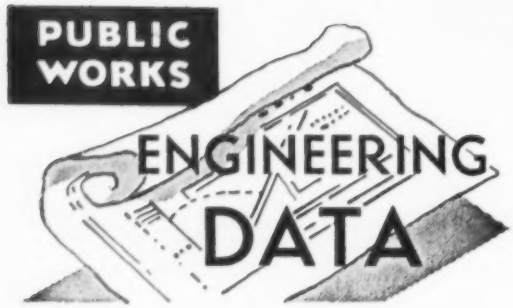
The big difference in traffic controls is that Electro-Matic® automatically proportions the green light to changing demands of traffic. Electro-Matic Traffic-Actuated Controllers *can* give you safe, efficient control of holiday, rush hour, or normal traffic.

To get proof of this statement, send for free literature — or better still, write and tell us about your traffic signal problems. We will be happy to discuss them with you.

TRAFFIC ACTUATED

AUTOMATIC SIGNAL
DIVISION
EASTERN INDUSTRIES, INC.
NORWALK • CONNECTICUT

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.



Radar Machine Pays For Itself

The Lincoln, Nebr., radar automobile speed determining machine has paid for itself in fines and costs in municipal court according to the Lincoln Evening Journal. In nine court days, 113 speeders clocked by the machine have paid $1,123. The device cost $1,032.

Cost of Handling Sludge from Lagoons and Beds

Though the cost of handling sludge is highly variable, and differs materially from place to place, some cost data are presented in a recent issue of the "Digester" of the Illinois State Sanitary Engineering Department. At Decatur, where only a part of the sludge is dried on beds, the cost of removal from the beds was 65 cents a cu. yd. in 1952 and 84 cents in 1953. At Peoria, where the sludge is loaded into industrial cars running on tracks, the cost in 1951 was 51.6 cents per yd. Shallow lagoons are also used in Peoria, with the depth controlled so that the dried sludge is about 8 ins. deep. Removal costs from these lagoons run about $1 per yard. At Rockford, lagoons 4 ft. deep are used and removal of the dried sludge by crane costs about 75 cents per yd. It is not stated if these costs include removal and final disposal.

Cost of Laying Water Pipe in Elmira, N. Y.

During the calendar year 1953, the Elmira, N. Y., Water Department laid 22,800 ft. of water main, from 1-inch to 12-in in size. Costs, as reported in the annual report for 1953, were as follows: Small, 2,147 ft., average cost per ft. $2.35; 6-inch, 13,144 ft., average cost $3.41 per ft.; 8-inch, 2,407 ft., average cost $4.38 per ft.; 10-inch, 3,894 ft., average cost per ft. $4.80; and 12-in., 1,293 ft., average cost per ft. $9.07.

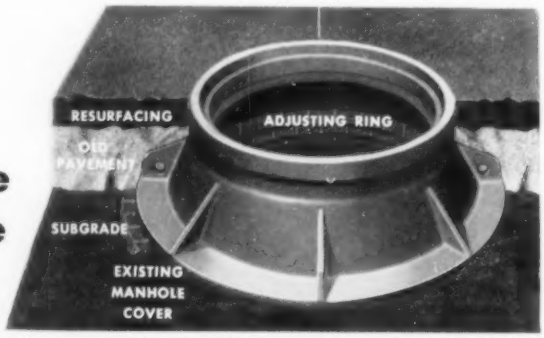
Costs of and Equipment for Cooking Garbage

Cooking of garbage before feeding to hogs is now accepted (and usually required) practice. Average cost of cooking, according to the USDA, is $7.35 per ton when using direct-fire equipment and $2.71 per ton when using steam cooking methods. Costs will vary with size of installation. In regard to equipment, Littleford Bros. recently announced that their 84-HD kettle, equipped with a manual agitator and a watertight discharge gate, is suitable for herds of 50 to 300 hogs. For the large commercial job, where thousands of hogs are fed, Littleford recommends the Tankar heater, which will cook 6 to 8 tons completely in 2 to 3 hours.

RESURFACING?

then save money with the original NEENAH manhole adjusting rings

Neenah Foundry adjusting rings boost manhole cover flush with refinished roadway surface — may save as much as 80% of cost of digging and resetting to new grade. Cutaway view shows old manhole frame still in place after resurfacing — thanks to the addition of a Neenah adjusting ring. Available for square and rectangular frames and in standard and special sizes.



Adjusting ring added to existing manhole permits resurfacing for as little as 20% of the cost of replacing or raising existing frame.

Type A adjusting ring with vertical outside surface.

Type B adjusting ring with flared outside surface.

Existing manhole lid sets flush with refinished roadway surface after adding the cost-saving Neenah adjusting ring.

NEENAH FOUNDRY COMPANY Neenah, Wisconsin

Chicago Office 308 W. Washington St., Chicago, Ill.

Write for our 140 page Catalog "R", second edition.

Get full details of this month's products . . . mail your Readers' Service card today.

FRINK V-TYPE PLOWS ARE SELF BALLASTING

EASIER! FASTER! SAFER!

All Frink V-Type Sno-Plows — which will clear the heaviest snow fall — are equipped with exclusive heel adjusting chains which automatically ballast the front end of the truck and prevent side slipping. This makes trucks easier and safer to drive and therefore prevents excessive wear and damage to equipment.

Another factor that makes the Frink push easier is that the cutting edge is built with sufficient shear to raise the snow up and over the adjoining snow and keep it moving at all times.

Frink Reversible Type, One-Way Type, V-Type and the Frink Roto-Broom are interchangeable on the same truck attachment.

For further information on this Sno-Plow, write for catalog to nearest address, Box PW 548

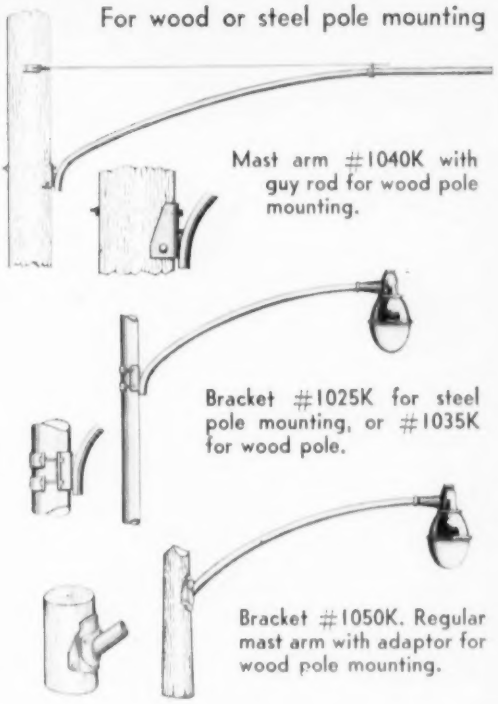
FRINK SNO-PLOWS

FRINK SNO-PLOWS, INC., CLAYTON, NEW YORK
DAVENPORT-BESLER CORP., DAVENPORT, IOWA
FRINK SNO-PLOWS of CANADA, LTD., TORONTO, ONT.

KERRIGAN Weldforged
Steel Brackets & Mast Arms

For Economy & Beauty

For wood or steel pole mounting



Mast arm #1040K with guy rod for wood pole mounting.

Bracket #1025K for steel pole mounting, or #1035K for wood pole.

Bracket #1050K. Regular mast arm with adaptor for wood pole mounting.

Kerrigan's complete line of brackets and mast arms are carefully engineered for easy installation and wiring. They meet all I.E.S. street lighting recommendations. So, take advantage of your wood poles now in place and brighten up your city or town NOW!

Let us help you

solve your city's lighting problems. Send for our FREE catalog containing engineering data. It shows how simple installation really is.

KERRIGAN IRON WORKS, INC.
Nashville, Tennessee
Gen'l. Sales Office — 274 Madison Ave. — N.Y.C.

PUBLIC WORKS DIGESTS

THE WATER WORKS DIGEST

Constructing Concrete Reservoir Floors

Some engineers believe in laying reservoir floors without expansion joints, using temperature reinforcing to reduce cracking to a minimum; but the author considers that installing a system of joints throughout the floor is the proper plan, placing joints 20 to 60 ft. apart—preferably not more than 40 ft. Most engineers now specify a dam or water stop in all expansion or construction joints, using galvanized iron, steel plate, strips of soft wood, sheet copper, rubber, plastic, or fabric impregnated with asphalt or pitch. San Bernardino, Calif., has used copper stops combined with a bituminous rubber compound used as a surface sealer. The copper used is 16 oz., hot rolled, soft copper in strips 16 in. wide. The strip is bent into a U at the center and this is filled with mastic to keep out the concrete. During the finishing of the secondary slab, a wedge-shaped piece of wood is driven into the wet concrete adjacent to the initial slab, forming a notch into which heated rubberized asphalt is poured. For ease of construction and avoidance of possible damage, rubber seals have a definite advantage over soft annealed copper, the "labyrinth" water stop being best.

"Expansion Joints in Concrete Reservoir Floors". By Leslie A. Hosegood, Supt. Munic. Water Dept., San Bernardino. *Journal Am W W Assn.*, June.

Maintaining pH In Open Reservoirs

Baltimore, Md., so treats its water supply as to maintain the pH at 7.9 as it leaves the plant. The distribution system of 1988 miles is divided into five zones, being pumped from each to the one above. Within this system, are five open reservoirs, and in passing through these reservoirs the water absorbs carbon dioxide, reducing the pH to 7.3 or 7.2 by the time it reaches the fifth zone. Most of the loss was found to be in two open reservoirs in zone 3. To prevent this loss, beginning late in 1952, soda ash has been added to these two reservoirs sufficient to maintain the pH at 7.7 instead of 7.3 as it was before this treatment. The complaints of rusty water from zones 3, 4 and 5 were reduced. The average dose of soda ash was 1.27 ppm, or 37,800 lb. during the year. The treatment cost $1,582 in 1953, but is considered to be justified by reduction of the water wasted in weekly and other periodic flushing of the mains.

"Soda Ash Used to Maintain pH in Open Distribution Reservoir". By Edward S. Hopkins, Prin. Asst. Engr. *Water Works Engineering*, June.

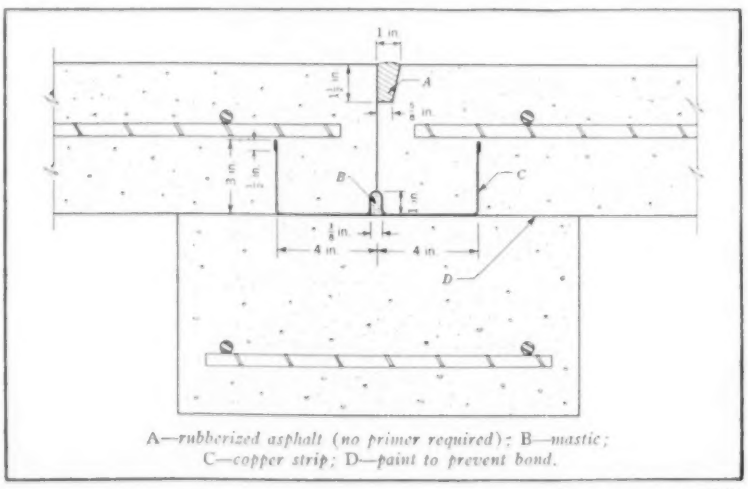
Treating Saline Waters by Electrodialysis

Within the past few years American and European chemists have developed a process utilizing electrodialysis for reclaiming saline waters, possibly even sea water. This is essentially a method of using electrical forces to pull cations and anions through semipermeable ion-selective membranes, leaving water behind. Certain types of plastic membranes permit the passage of only positive ions, other types will pass only negative ions. As of February, 1954, a limited number of field installations utilizing this idea have been operated. It is estimated that plant costs will vary from $20,000 to $300,000 per mgd of capacity, and power demands from 5 to 50 kwh per 1,000 gal of desalted water.

"Reclamation of Saline Waters by Electrodialysis Shows Promise". By Rolf Eliassen, Prof. of San. Eng. M.I.T. *Civil Engineering*, June.

Mechanical-Joint Pipe in Washington

Washington, D. C., in 1942 installed over a mile of 24-in. mechanical-joint cast-iron pipe, and in 1949 adopted mechanical joints as standard for 8-in. pipe; and by the fall of 1953 had laid 250,000 ft. of this and also considerable quantities of



A—rubberized asphalt (no primer required); B—mastic; C—copper strip; D—paint to prevent bond.

Courtesy Journal AWWA

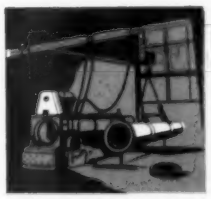
● **COPPER and rubberized asphalt joint for a concrete reservoir floor.**

Ore and Coal Mines

Coke Ovens

our integrated operation means undivided control of quality

Blast Furnaces



Pipe Plants

U.S. cast iron PIPE

FOR WATER, GAS, SEWERAGE AND INDUSTRIAL SERVICE

We are a wholly integrated pipe-producing unit — with mines, quarries, blast furnaces and laboratories under one direction and control.

What does this mean to you, a pipe buyer? It means that we are in the best possible position to take *complete* and undivided responsibility for the quality of our product . . . from raw materials to finished pipe.

In addition to being able to control the quality of pipe-making raw materials at their sources, our Quality Control of pipe production gives further assurance to customers that the quality level of U. S. Cast Iron Pipe is in excess of standard specifications. Our pipe is produced to *our own* quality control specifications, more exacting than the established specifications under which cast iron pipe is normally purchased.

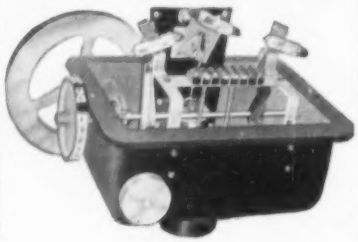
U. S. PIPE & FOUNDRY COMPANY

GENERAL OFFICES: BIRMINGHAM 2, ALABAMA

A wholly integrated producer . . . from mines and blast furnaces to finished pipe.

Now's the time to mail this month's Readers' Service card.

ROTO-TROL



RF-2
with ALTO-TROL

Puts that second pump to work.

A 2-pump RF-2 ROTO-TROL with a built-in ALTO-TROL will operate each pump on alternate starting cycles, assuring equal use and wear of both pumps. Operates both pumps when required. FLOAT-CONTROLLED. Depth Indication optional — extra.

Write for full data.
Water Level Controls Division
HEALY-RUFF Company
791 Hampden Ave., St. Paul 4, Minn.

HEAVY-DUTY
ELLIS PIPE CUTTER
FOR CUTTING LARGE SIZE PIPE

Drop-Forged Frame and Links
Long-Lasting Cutter Wheels
Makes a Hit With Water Works Men
Cuts Pipe in or Out of Ditch

TWO SIZES
No. 01 for 4" to 8" Pipe
No. 1 for 4" to 12" Pipe
Write for Circular and Price List No. 35PW

ELLIS & FORD MFG. CO.
FERNDALE 20, MICH.

other sizes from 4 to 24-in. The cost has been somewhat less than lead-jointed, slightly more than sulphur-jointed. The joints are nearly fool-proof, but occasionally bolts have been omitted or not tightened, causing leaks. The most important advantages are the flexibility of the pipe line and the ability of the joints to move within relatively high limits without leaking. At first many bolts were broken when being tightened but providing the men with torque-limiting wrenches has eliminated this. Tight joints can be made in wet trenches. Leaking joints almost never occur.

"Experiences with Mechanical-Joint Pipe in the Washington Area". By Roy L. Urndorff, Supt., Dept. of San. Eng. *Journal Am W W Assn.*, June.

Equipment of Meter Maintenance Shops

The amount of equipment installed in a meter maintenance shop varies with the number of meters in service, the number of makes and types used, the quality of the water, location and type of meter settings, local practice or legal requirements as to frequency of testing, customer ownership of meters and employment of special practices in refurbishing meter casings during repair.

The basic equipment, in the order of importance are: A tank either accurately calibrated or on an accurate scale. A substantial workbench with vise, hammer, mallet, screwdrivers, scrapers, wire brushes, etc. A sink with running hot and cold water. A test bench for domestic-size meters. A rate-of-flow indicator. An electric grinder. Storage bins for meter parts. An adapter for testing 1¼-in. to 2-in. meters. A small air compressor. A bench drill press or electric hand drill. Chemical cleaning equipment. A test bench for large meters. An electric or air driven impact wrench. Small meters *can* be tested using only an accurate tank, a watch and a few valves and fittings.

"Equipment and Layout of Meter Maintenance Shop". By David J. Ford, Ford Meter Box Co. *Journal Am WW Assn*, June.

Maintaining Nutating Disk Meters

Important points in maintenance and repair of nutating disk meters are: Clean all meters thoroughly. Make sure the gear train runs freely. Check the action of the disk in the chamber before and after assembly in the main casing. Remember that friction is just as detrimental to a meter as leakage. Store meters away from steam pipes, hot water lines, furnaces, and other sources of heat. Use a new meter as a standard of comparison for tolerances and clearances. Do not hesitate to call on the manufacturer and his staff for help.

"Maintenance and Repair of Nutating-Disk Meters in Small Plants". By Russ Olsen and Henry DePagter, Badger Meter Mfg. Co., *Journal Am WW Assn*, June.

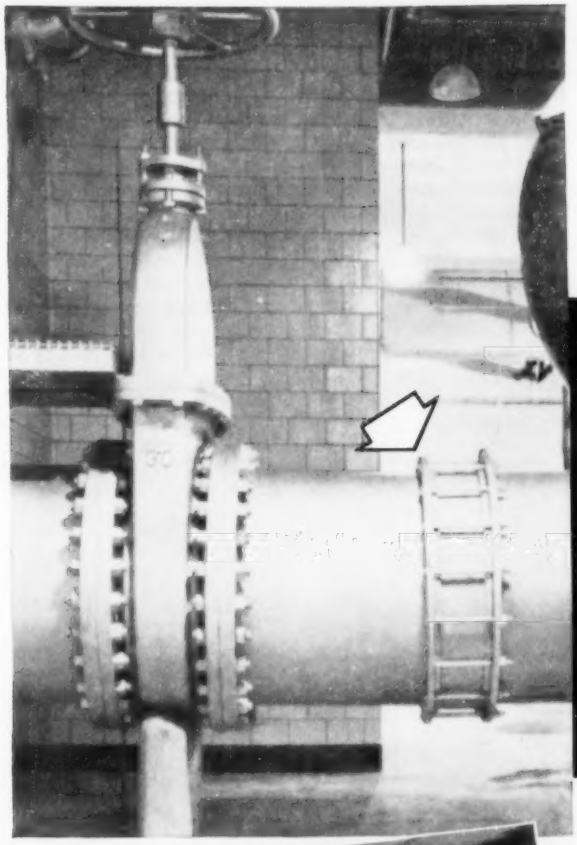
Chemical Cleaning of Wells

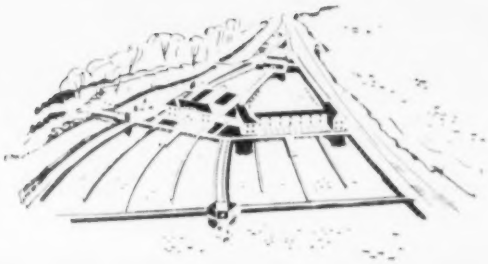
The Duhernal Water System, Parlin, N. J., has been cleaning its gravel-packed wells by use of chemicals for ten years. Of its 18 wells, four are cleaned every 10 weeks, six are cleaned once a year and four at 20 to 75-week intervals. The cleaning program is conducted in three phases; cleaning the sand stratum and gravel back around the well screen; chemical cleaning of the screen, pump and pump discharge column; and mechanical cleaning of connecting pipelines and distribution systems. For cleaning the sand and gravel, a combination of 25 lb. of sodium hydrosulfate, a reducing agent, with 50 lb. of tetrasodium pyrophosphate is found best, followed, if necessary, by inhibited sulfuric and hydrochloric acid. Deposits in well screen, pump and connecting pipelines are mainly bacterial growths, which are usually removed by use of inhibited sulfuric acid, or hydrochloric acid if the deposit is a hard scale. Several other chemicals have been tried but their effectiveness has not been completely evaluated. The author describes the method of using each of these. Some of the wells lose 16.5 to 30 percent of their capacity ten weeks after cleaning, and as much as 35 percent in twenty weeks.

"Maintaining Well Production by Chemical Cleaning". By Gordon L. E. Linn, Manager. *Journal, Am WW Assn.*, June.

Selecting Chemicals For Fluoridation

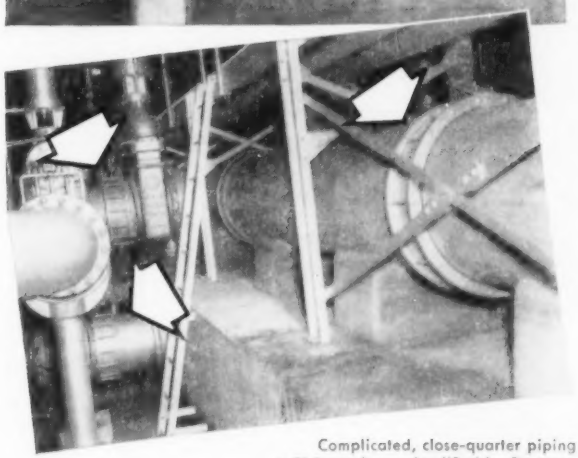
A large number of fluoride compounds could be used for fluoridation, but because of availability and general characteristics, only sodium fluoride, sodium silicofluoride, and hydrofluosilicic acid have been gen-





at Richmond, Virginia...

DRESSER COUPLINGS *Safeguard Big Valves*



Complicated, close-quarter piping at Richmond was simplified by Dressers. Required no exact pipe fitting, absorbed pipe movement without leakage.

Marsden C. Smith, Richmond's Chief Water Engineer, writing in *Water & Sewage Works*, says, "The design of the large valves controlling the filters in our No. 2 Purification Plant has been greatly improved by the use of 'plain ends' connected by flexible couplings. This eliminates dangerous stresses on the valve bodies, due to expansion and contraction, and also provides a simple means of replacing the valve, or its removal for repairs."

Dresser Couplings make big-pipe installations easier, faster . . . even in close, cramped quarters. Dressers can give or take as much as 3/8", deflect as much as 4° or more.

Dresser Couplings eliminate expensive maintenance . . . assure lifelong dependability.

DRESSER®

COUPLINGS

Dresser Manufacturing Division,
(One of the Dresser Industries)
69 Fisher Avenue, Bradford, Pennsylvania

SEND FOR FREE ENGINEERING DATA

Interesting, informative data on diversified Dresser installations.

DRESSER MANUFACTURING DIVISION
69 Fisher Avenue, Bradford, Pa.

Please send me your latest "Report of Dresser-Coupled Lines", and copies of your Expansion Joint and Style 38 Catalogs.

Name_____

Title_____

Company_____

Address_____

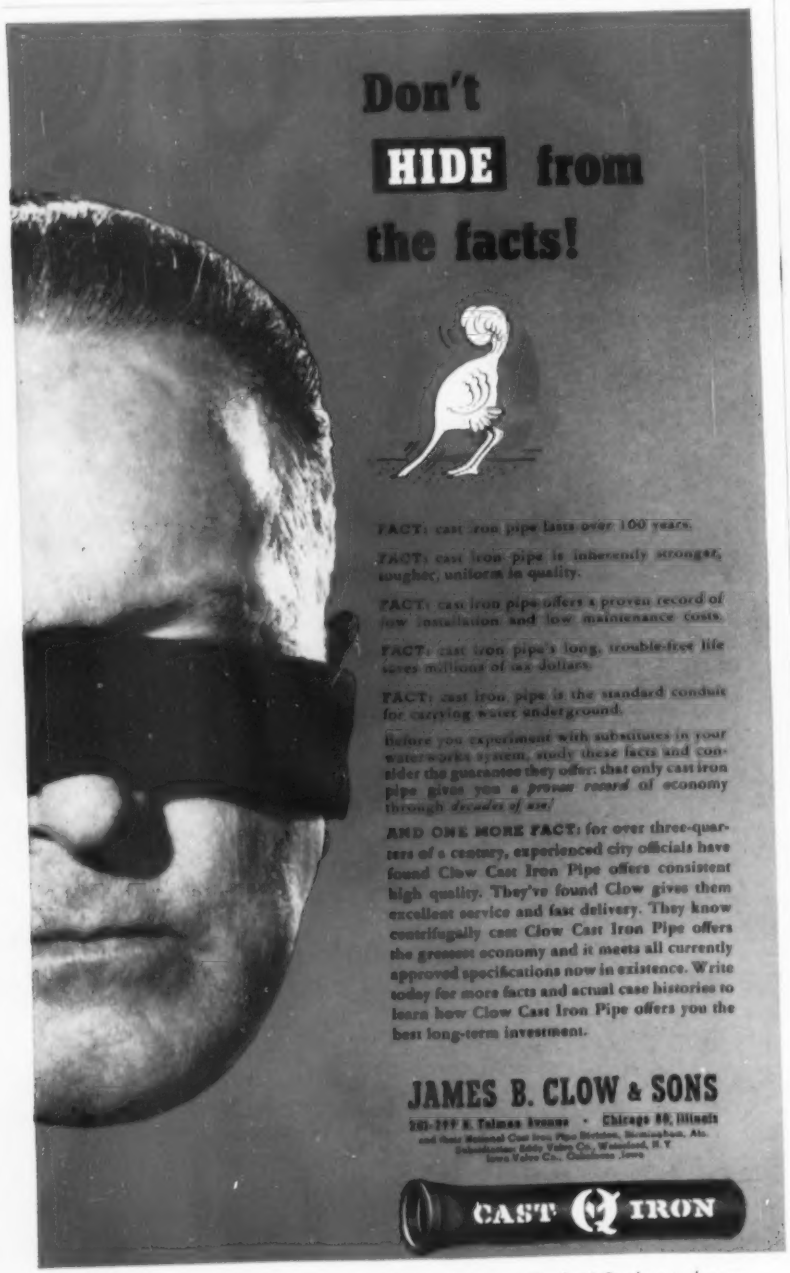
Get full details of this month's products . . . mail your Readers' Service card today.

erally used thus far. Sodium silicofluoride must be handled in bags or barrels, and it is conceivable that the labor cost of transporting these by hand trucks or pallets, plus storage space and the transfer to hoppers, may overcome the present hydrofluoric acid price differential. Several large cities already have found that the decreased labor charges overbalance the price differential and have decided to use hydrofluosilicic acid rather than sodium silicofluoride.

Sodium fluoride is the most expensive but the most soluble. The price has remained fairly stable for years and there is every reason to believe that it will continue so. The same problems of transfer, storage and labor apply to this as to sodium silicofluoride; but it is practically neutral, and common materials can be used for dissolving chambers, reagent tanks, etc.

Hydrofluosilicic acid is approaching a more favorable economic position as a source of fluoride ion. It is a by-product and must be disposed of, and some manufacturers, if a constant demand is assured for large lots on long-term contracts, will be willing to make the necessary investment in rubberlined shipping containers, as well as tank cars and trucks, and, furnish the acid at prices competitive with sodium silicofluoride. The fluoride concentration of this liquid gives it an added advantage because of the decreased volume to be handled. Hydrofluosilicic acid is, usually, fed directly from the shipping container through solution feeders, involving no manual handling. In general, solution feeders are much less expensive than dry feeders, which is an additional economic advantage of this acid.

"Review of Practical Fluoridation". By Gerald H. Lamprey, BIF Industries, *Journal, Maine Water Utilities Assn*, May.


Don't
HIDE from
the facts!
FACT: cast iron pipe lasts over 100 years.
FACT: cast iron pipe is inherently stronger, tougher, uniform in quality.
FACT: cast iron pipe offers a proven record of low installation and low maintenance costs.
FACT: cast iron pipe's long, trouble-free life saves millions of tax dollars.
FACT: cast iron pipe is the standard conduit for carrying water underground.
Before you experiment with substitutes in your waterworks system, study these facts and consider the guarantee they offer: that only cast iron pipe gives you a proven record of economy through decades of use!
AND ONE MORE FACT: for over three-quarters of a century, experienced city officials have found Clow Cast Iron Pipe offers consistent high quality. They've found Clow gives them excellent service and fast delivery. They know centrifugally cast Clow Cast Iron Pipe offers the greatest economy and it meets all currently approved specifications now in existence. Write today for more facts and actual case histories to learn how Clow Cast Iron Pipe offers you the best long-term investment.
JAMES B. CLOW & SONS
201-299 E. Talman Avenue • Chicago 80, Illinois
CAST IRON
Need more facts about advertised products? Mail your Readers' Service card now.

St. Augustine's Water Supply

St. Augustine, Fla., has a population of 18,000 and in addition has 5,000 winter visitors. The water consumption is about 1.8 mgd in winter; but is 2.5 mgd in summer with only about three-fourths as many consumers, lawn sprinkling being the reason. The water is obtained from 15 wells 65 to 90 ft. deep in coquina shell rock, the voids in which run as high as 18%. The wells cost about $5,000 each. The water is very hard. A typical analysis shows 429 ppm total solids, 119 ppm calcium, 349 ppm carbonate ion, 286 ppm carbonate hardness, and 312 ppm total hardness. The water is treated with an average per day of 3,000 lb. of lime, 300 lb. of soda ash, 45 lb. of ammonia, 25 lb. of sodium silicate and 28 lb. of chlorine. After settling, it passes through 30 in. of sand on 18 in. of gravel and is pumped to an underground storage tank and elevated tanks. The 4-5 tons of sludge produced per day is wasted in a marsh.

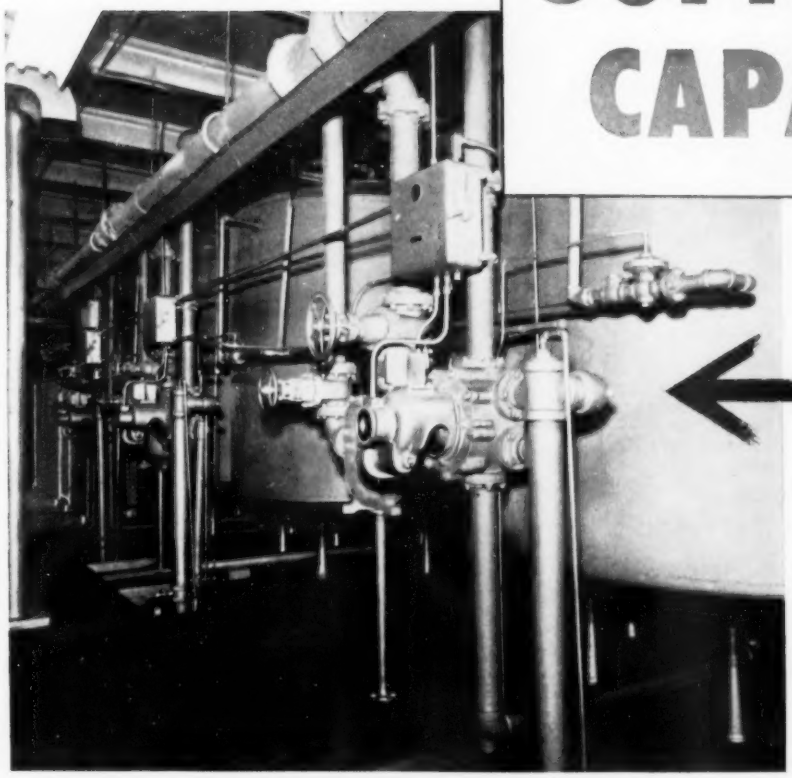
"Fresh Water for St. Augustine". By Guy Browning Arthur. *Public Works*, July.

Multiple Treatment Units

About four years ago a treatment plant was installed for the Alexandria, (Va.) Water Co., in which mixing, settling and filtration were combined in a single structure. Since then, three similar plants have been installed and operated, and several others are under construction. In these plants each unit consists of concentric steel or concrete rings with a central mixing compartment surrounded annularly

How the Town of Normal, Illinois

TRIPLED SOFTENING CAPACITY



...of the same softeners

...by changing to PERMUTIT Q

Replacing old-fashioned zeolite with the high-capacity ion exchange resin, Permutit Q, saves Normal over $7,000 a year!

Normal's three automatic softeners were installed back in 1946, before high-capacity Permutit Q was available. Each softener removed hardness from 83,000 gallons of water between regenerations for a daily delivery of 700,000 gallons of softened water.

Recently town officials called in Consulting Engineers, Farnsworth and Conley, of Bloomington, Illinois, who recommended replacing zeolite with modern, high-capacity Permutit Q.

Look at the benefits gained from this change! The capacity of each softener is up from 83 to 270 thousand gallons between regenerations. Salt Consumption – down to about ¼ lb. per thousand grains of hardness removed. Flow Rate–up from 285 to 510 gpm. Regenerations – down from 3 times to once per day per softener.

A change to Permutit Q may effect similar economies for your city. We'll gladly send helpful data.

The Permutit Company, Dept. PW-8, 330 West 42nd Street, New York 36, N. Y., or Permutit Company of Canada, Ltd., 6975 Jeanne Mance Street. Montreal.

WATER CONDITIONING HEADQUARTERS FOR OVER 40 YEARS

PERMUTIT®

Thousands use our Readers' Service card to keep up to date ... do you?

by a settling compartment, which in turn is surrounded by an annular filter bed. In the later installations, the newest developments in sludge concentration by the upward flow sludge blanket principle have been used. The several plants under construction and contemplated include automatic control of filter washing.

During the four years of operation of similar installations, involving the use of open filters in the Lake Erie region where there are periods of sustained sub-freezing cold, caused no trouble from ice.

The construction costs of plants of this kind have been little more than half those of conventional plants of similar capacity. This idea of multiple units has been used by the Dorr Co. in the Dorrco-Aldrich Peri-Filter System, in which their "Hydrotreater" is used. A plant under construction at Greenwich, Conn., uses Hardinge equipment for continuous sludge removal.

"Multiple Water Treatment Units". By E. H. Aldrich, Chief Engr, Amer. Water Works Service Co. *Water & Sewage Works*, June.

Pipe Line Equipment
WATER • GAS • SEWER

Bottled Gas Lead Melting Furnace

Calking Tool Outfit

For water mains up to 12". Strong leather bag. Keeps the right tool for every job within easy reach.

Portable Lead Melting Furnace

A handy outfit for quick action, equipped with gasoline burner.

Asbestos Joint Runners

Best quality asbestos rope, brass caps attached to each end. Equipped with clamps.

Pipe Cutter

Inexpensive way of cutting pipe. Every wheel in contact with the pipe is a cutting disc, so cutter need be moved only a short distance to cut entirely around the pipe.

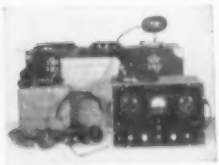
M-D Cut-In Connections for Sewers

A light cast iron fitting with bell end for connecting house service with main sewer pipe without necessity for placing a Y-branch or T-branch in the sewer line.

Test Plugs for Bell or Spigot End Cast Iron Pipe.

Tapax

The original manhole cushion. Takes the bang out of manhole covers.



Leak Detector

A truly fine instrument designed to solve even the most difficult leak detecting problem.

On this page are shown only a few of the hundreds of items to be found in the POLLARD Catalog. Write for a copy of Catalog No. 25A.

M-Scope Pipe Finder

It's easy to locate a buried pipe line with this handy pipe finder.

JOSEPH G. POLLARD CO., INC.

Western Office
1064 Peoples Gas Bldg.
Chicago, Ill.

MAIN OFFICE AND FACTORY
New Hyde Park, N. Y.

Southern Office
333 Chandler Bldg
Atlanta, Ga.

Now's the time to mail this month's Readers' Service card.

Other Articles

"Water for the Year 2,000" is the aim of San Francisco. By Dwight H. Barnes, Public Works, July.

"Filter Plant, Expandable Automatic Water", capacity 21 to 63 mgd, recently built by East Bay Municipal Utility District. By Loring E. Hanson, Asst. Mech. and Elec. Engr. Public Works, July.

"Safety Program, Progress Toward an Industrywide". By Raymond J. Faust, Exec. Asst. Secy. A.W.W.A. Journal, Am. W. W. Assn., June.

"Water Works Relocations, The New York State Thruway and". By Thomas M. Riddick. Journal AWWA Assn., June.

"Emergency Operating Procedures for Water Systems, Establishing". By John D. Wedeman, Chf, Water & Sewage Br., Fourth Army. Journal, AWWA, June.

"Storage Facilities, Considerations in Selecting Distribution". By M. D. R. Riddell. Journal AWW Assn., June.

"Filter Bottoms, Types of". Describes the Leopold, porous plate, Wagner, and Wheeler bottoms. Journal Am W W Assn., June.

"Activated Silica, Preparation and Use of". By A. E. Griffin, of Wallace & Tiernan, Inc. Jnl. AWWA, June.

"Fluoridation at Indianapollis". By Robert J. Becker, Asst. Supt. Journal, Am WW Assn., June.

"Delaware River Supply Eases New York Water Shortage". By Stanley M. Dore, Dep. Chf. Engr. Water Works Engineering, June.

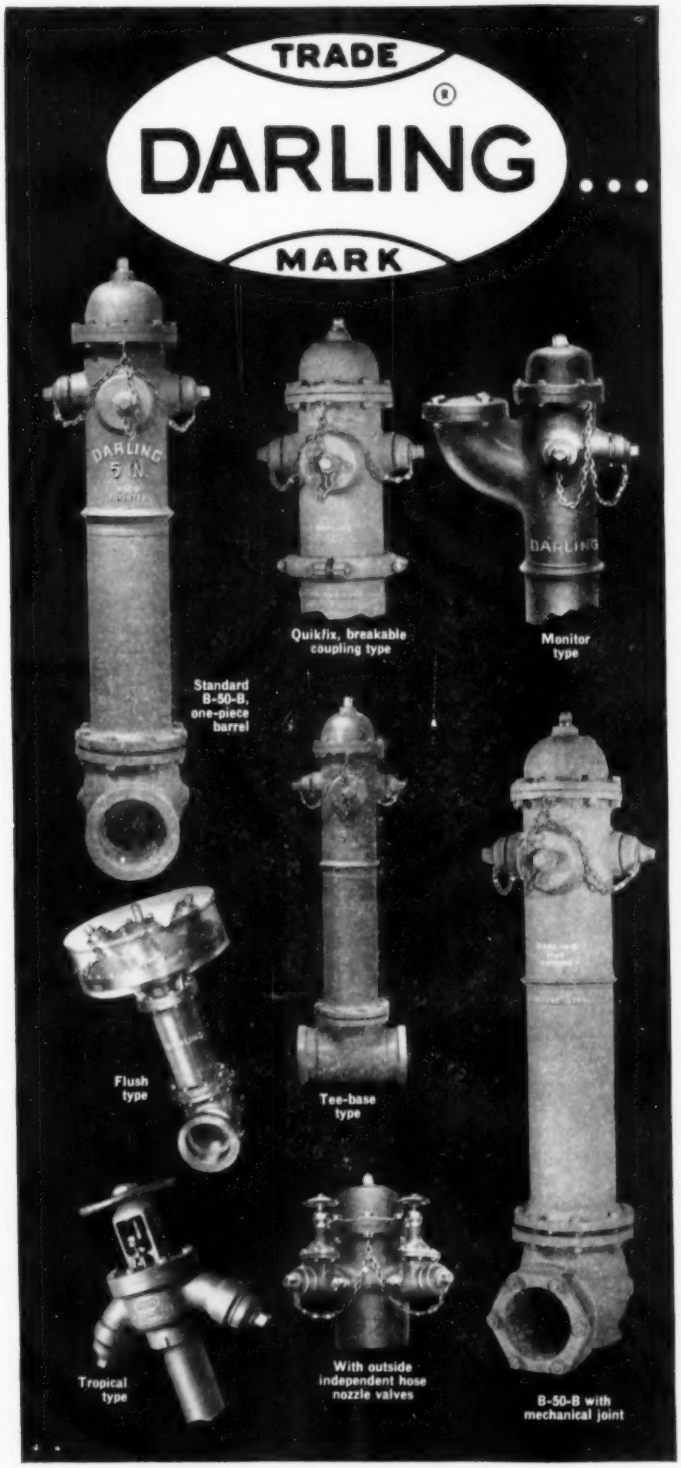
"Freezing Cast Iron Mains as Shut-off Measure". By W. S. Maus, WW Engr of Burbank, Calif. Water & Sewage Work, June. (See Water Works Digests for May).

• • •

Filter Plant Capacity Increased at Jasper, Ala.

The capacity of the Jasper, Ala., water filter plant has been increased from 700 gpm to 1300 gpm, though the source of supply and the intake remain the same. Improvements include a new raw water pump with a capacity of 1500 gpm; increased and modified chemical treatment and sedimentation facilities; and two 300 gpm filter units. The new settling basin is equipped with hoppers for the removal of sludge. The filters have complete control equipment and employ Palmer surface washing agitators. A new chemical laboratory has been added. J. E. O'Toole Engineering Co. prepared the plans; the contractor was the Harbert Construction Co.

W. U. Quinby is General Manager of the Water Board, of which Lawrence Davis is chairman.



TRADE DARLING MARK ... HYDRANTS

- **Featuring new ball-bearing operated B-50-B design**
- **Types and sizes for every requirement**

YOU'LL be ahead on many counts when you specify modern Darling Fire Hydrants. Just for example . . .

Your system can include hydrant types exactly right for special or unusual service needs — breakable coupling types where traffic damage is common, concealed flush types for airport and pavement installation, Tee-base types to eliminate lateral connections where practicable. These and a few of the other types are shown here.

Equally important, Darling's unique B-50-B development (now available in all except the Tropical type) introduces *ball-bearing* operation combined with "O" ring seals. Result: a packless, dry-top hydrant. No packing gland maintenance. Operating threads and bearings *stay* lubricated and water can't reach them. Operation is far easier, far faster . . . and you avoid lots of maintenance time and trouble.

Send for complete information. Better still, ask to have a Darling engineer check your needs and tell you just what you stand to gain with Darling Hydrants.

TRADE DARLING MARK

DARLING VALVE & MANUFACTURING CO.

Williamsport 22, Pa.

Manufactured in Canada by The Canada Valve & Hydrant Co., Ltd., Brantford 7, Ont.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

PUBLIC WORKS DIGESTS

THE SEWERAGE AND REFUSE DIGEST

Cause of Sewer Explosion in Cleveland

In September, 1953, an explosion occurred in a 5 ft. to 7 ft. combined sewer in Cleveland, O., destroying 5,500 ft. of this sewer and the pavement above it; shocks were felt in branches connected with it, in one of them 30 to 80 minutes after the major explosion. A thorough investigation to learn the cause has been made by a committee of consultants headed by three professors at Case Institute of Technology. They studied the hydraulics of the sewers, and the ventilation of them; with explosimeters they tested for flammables in sewers and the surrounding ground, including gasoline vapors; and investigated wastes discharged into the sewers by industries. They found that these latter included at least 200 or 300 gal. of ether solubles daily. The exact cause of the explosion was not determined, but the committee reported that "Either industrial wastes, or gasoline leaking into the sewer, or these in combination, accounted for the explosion and for the magnitude and spread of the damage." The committee recommended routine tests for flammables, and regulation of gasoline stations and industries discharging wastes into the sewers.

"Case of the Exploded Sewer." *Engineering News-Record*, May 27.

Residuals in Sewage Effluents

A sewage effluent completely free from suspended matter and whose organic content has been fully oxidized will contain residues of permanganate absorption, nitrates, potassium salts and phosphates, traces of hydrocarbons, higher phenols, detergents and a variety of other materials in small concentrations. Also metallic residues in sewage from an industrial town. There may be cyanide measureable in parts per 100 million, chlorides, sulfates and other salts. Foam in effluents due to detergents had been found to contain as much as 2,000 ppm of anionic detergent, which may have a toxic effect on fish and water weeds. Traces of copper that would not be objectionable in a water supply might kill algae in a stream.

"Residuals in Sewage Effluents." *Contractors Record* (England), May 19.

Radon As a Tracer of Sewage

The natural radon method of tracing sewage appears to give a satisfactory procedure for estimating initial dilution at outfalls. In studying tidal effects, using radium as an added tracer appears to offer the best possibilities, especially if stagnation of sewage in shore pockets is to be investigated. In studying infiltration into sewers, by measuring the natural radon content at two points in a length of sewer which has no side connecting sewers, it would be possible to detect infiltration by a corresponding increase of radon content as the sewage flows downstream.

"Radon in Sewage Outfall Studies." By T. G. Bullen and William F. O'Connor, Dept. of Pub. Wks. Westchester Co., N. Y. *Sewage and Industrial Wastes*, May.

Manpower for Operating Plants

The number of persons required to operate a sewage treatment plant is dependent upon several factors, the more important being: (1) The size of the plant and the nature of the treatment process. (2) The amount of mechanical or labor-saving devices provided. (3) The efficiency of the personnel available. (4) The funds available. (5) The extent to which good operation, good housekeeping and good maintenance are practiced. (6) The length of the work week and union requirements. Small plants which have only a limited amount of mechanical equipment and where sludge is dewatered on beds can be operated with one man daytimes, with occasional outside help to clean sludge beds. But the operating staff of the Chicago Southwest plant exceeds 500. A small Imhoff and trickling filter plant often can be operated by one or two men. Landscaping should be so designed as not to require an undue maintenance force.

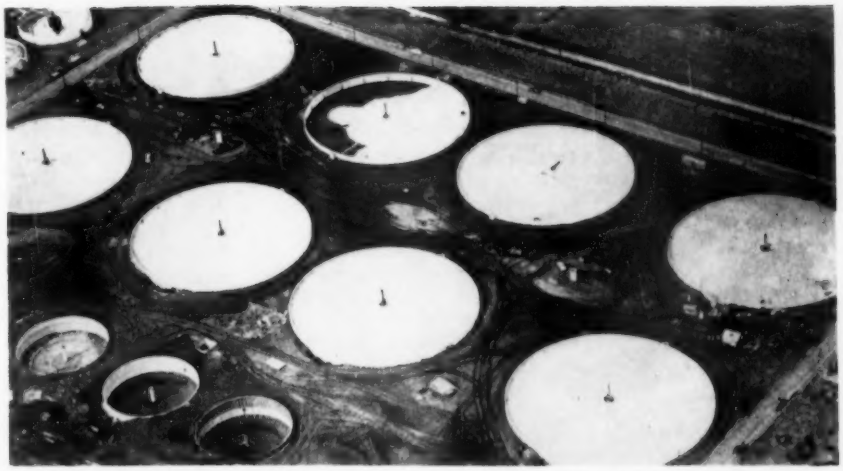
In the discussion of this paper, Paul W. Reed, USPHS, said that in general primary plants for populations of 2,000 to 14,000 required one man—in many cases not full time for that one man. For operating a trickling filter plant for 700 to 5,000 population about the same; but for 20,000 to 55,000 population a trickling filter plant required 6 to 9 men 40 hr. per week. An activated sludge plant serving 5,000 to 12,000 requires 4 to 7 men; for 35,000 to 41,000, 10 to 16 employees. The method of handling sludge is an important factor, requiring 21% of the time in one plant serving 65,000 population.

"1953 Operators' Forum: Manpower Requirements." By Edwin B. Cobb. *Sewage and Industrial Wastes*, May.

Composting Refuse In New Zealand

For several years the Interdepartmental Committee on Utilization of Organic Wastes of New Zealand has been experimenting on refuse composting. Last year they operated at Auckland a fully mechanized pilot plant adequate to serve a population of 10,000 to 20,000 people; and at Masterton a plant handles the refuse from a population of 12,000, producing about 550 tons of compost annually, which sells for about $22.40 per ton.

Why Trickling Filters are best for



8 200-foot trickling filter units at Fort Worth, Texas, with Translot filter blocks by Texas Vitrified Pipe Company.

GOOD RESULTS:

If you want Top-notch efficiency—say 20 ppm BOD—day after day, year after year, use trickling filters. Your consulting engineer can design them to produce whatever quality of effluent you need—not only now, but for many years in the future.

And the best trickling filters use *vitrified clay filter bottom blocks.* The reasons for this are fully described and illustrated in the new edition of the popular HANDBOOK OF TRICKLING FILTER DESIGN, revised to 1954. If you lack a copy, write any member of the Institute for yours. It's free.

TRICKLING FILTER FLOOR INSTITUTE

Bowerston Shale Co., Bowerston, Ohio
Industrial Materials Co., Philadelphia 34, Pa.
Texas Vitrified Pipe Co., Mineral Wells, Tex.
Natco Corporation, Pittsburgh 22, Pa.
Pomona Terra-Cotta Co., Pomona, N. C.
W. S. Dickey Clay Mfg. Co., Kansas City 6, Mo.
Ayer-McCarel Clay Co., Inc., Brazil, Ind.

*Reg. Trade Mark of Infilco Incorporated.

Sewage sludge was mixed with the refuse, raw sludge being better than digested. The ground on which open heaps were to be piled for composting was covered with 6 in. of sawdust. For a larger plant, a silo was built in which the refuse was dumped into the top and removed from the bottom by screw conveyor. Before placing in the silo, bottles, cans, etc., are picked out by hand and the material passed through a hammermill. The material stays in the silo for about 2 weeks, being kept 6 ft. deep. After being withdrawn, the material is kept in a maturing yard for 9 months; being turned after 6 weeks, and again after another 6 weeks (a Barber-Greene loader is recommended for this). When it has matured sufficiently, the material is screened. Material rejected by a ½-in. screen is passed through a grinder; that rejected by a 1-in. screen (mostly glass, metals, etc.) is taken to a dump.

"Refuse Composting Developments in New Zealand." By R. C. Lough, Ass't. Designing Engr., Ministry of Works, New Zealand. *PUBLIC WORKS*, July.

FLEXIBLE BOLTED CONNECTION

Savings in joint making time and labor costs, plus leak-proof flexibility, all combine to increase the demand for M & H Gate Valves with Mechanical Joint end connections. M & H Mechanical Joints are made in accordance with A. S. A. standard specifications A21.11, 1952, with glands, gaskets and bolts interchangeable with Standardized Mechanical Joints for cast iron pipe as furnished by all pipe companies who are members of the Cast Iron Pipe Research Association.

This joint uses the stuffing box principle, by which a thick gasket of triangular cross section is compressed into a stuffing box by a bolted follower ring or gland. Mechanical joint making in the field does not require skilled workmen. The joint's flexibility permits deflection in any direction, longitudinal expansion or contraction without leakage.

Mechanical Joint ends are available on all types of M & H Gate Valves, manufactured in accordance with American Water Works Association specifications, sizes 2 to 36 inches. For complete information, write or wire M & H VALVE AND FITTINGS COMPANY, Anniston, Alabama.

M&H PRODUCTS FOR WATER WORKS • FILTER PLANTS INDUSTRY • SEWAGE DISPOSAL AND FIRE PROTECTION

Thousands use our Readers' Service card to keep up to date . . . do you?

A Substitute For Trench Sheathing

Marshfield, Wis., has developed a "trench box" which it uses in place of timber sheathing and finds it to be cheaper and to give greater security to the workers. The box is 12 ft. long, has an inside width in the clear of 30 in. at the front end and 28 in. at the rear end, and the height is 9 ft., which can be extended to 12 ft. by use of detachable 3-ft. side plates if the trench is more than 9 ft. deep. In constructing it, a skeleton box was made by welding 3-in. steel pipe together; and ¼-in. steel plates were placed on the outside of the two sides of this skeleton box, welded to the pipes and to each other. These sides extend above the ground surface and prevent dirt and stones from falling onto the men as well as preventing collapse of the trench. The lowest cross braces are 28 in. above the bottom of the trench. As the work proceeds, the box is pulled forward by the trench excavator, whose bucket digs a trench 42 in. wide. The tapering width is to prevent friction of the steel plates against the earth as the box is drawn forward.

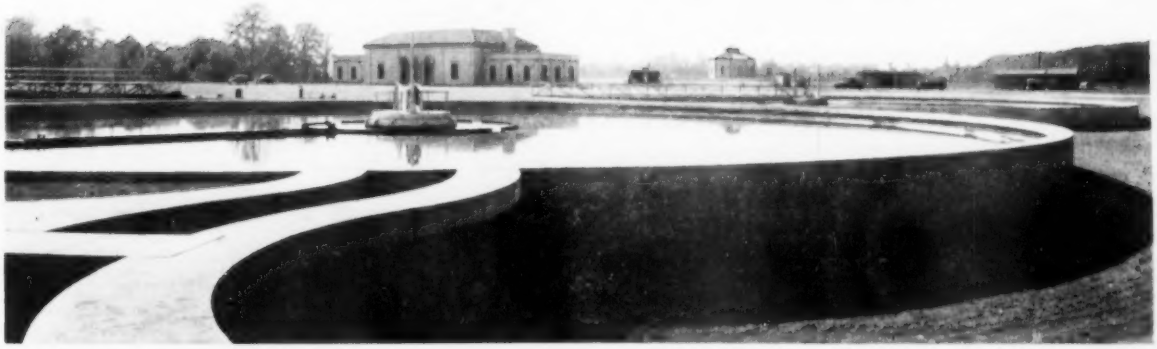
"Safer Trenching by Using Trench Box." By R. H. Schneider. *PUBLIC WORKS*, July.

Trends in Sewage Treatment

The Committee on Research, Federation of Sewage and Industrial Wastes Associations, in its annual Critical Review of the Literature of 1953, itemized 736 references, 102 more than for 1952. Of these, 64 dealt with analytical methods, 166 with sewage, 191 with industrial wastes, 59 with radioactivity, and 256 with water pollution. Nothing of startling importance was noted. The emphasis in sewage treatment was in the direction of increased loadings in biological processes. In loadings on sludge digestion tanks, two opposite trends were noticed, namely, that capacity of heated digesters handling primary sludge should be as high as 3 to 5 cu. ft. per capita; and, on the other hand, attempts at increasing the loadings of digesters. Claims made by promoters of bacterial and enzyme additives to increase biological action in the anaerobic digestion and activated sludge processes were not substantiated.

The agricultural utilization of sludge and reclamation of sewage for recharge of underground aquifers and for crop irrigation is be-

Figures Tell the Story about the Low Maintenance Costs with DORR CLARIFIERS



...and the Baltimore Sewage Treatment Plant is a typical **Case in Point...**

16 years ago the Baltimore Department of Public Works installed its first two center-drive Dorr Clarifiers. Since then, 4 additional units have been added. The figures below tell the actual repair costs story. They are not "exceptions to the rule" but are typical of the low maintenance costs of Dorr Clarifiers reported by city after city.

Maintenance costs are one of the primary factors upon which Clarifier excellence should be judged. Are you getting the best?

We'd like to tell you how Dorr Clarifiers stack up on performance, too. Ask a Dorr Engineer for the facts.

Here are the Repair Cost Facts

Number of Units	Size of Clarifiers	Years of Operation	Repair Parts Cost*			Repairs as % of	
			Total	Per Unit	Per Unit Per Year	Original Cost	Original Cost Per Year
2	170 ft. Diameter	16	$241.40	$120.70	$7.55	1.08	0.068
1	170 ft. Diameter	15	no repair costs to date				
2	126 ft. Diameter	14	168.20	84.10	6.01	0.95	0.068
1	170 ft. Diameter	3	no repair costs to date				

*includes modest unsegregated labor costs

Better tools TODAY to meet tomorrow's demand

DORR

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

FIFTY YEARS 1904-1954

THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.
Offices, Associated Companies or Representatives in principal cities of the world.

Now's the time to mail this month's Readers' Service card.

coming more prominent. Considerable advance was made in understanding the factors essential for successful composting. For the treatment and disposal of radioactive wastes, chemical coagulation, ion exchange, adsorption, activated sludge, and trickling filters have been studied; and disposal into dry wells, by burial, and by incorporation in concrete and then into the sea have been reported. Disposal of cannery wastes and some dairy wastes by ridge and furrow and spray irrigation on land with cover crops, legumes, and pasture land continues to attract attention. Anaerobic digestion of dairy wastes, especially whey and skim milk, is receiving a reappraisal. Successful digestion of slaughterhouse and brewery wastes with 12 to 15 hr. detention is noteworthy.

"A Critical Review of the Literature of 1953 on Sewage, Waste Treatment, and Water Pollution." Report of Committee on Research. *Sewage and Industrial Wastes*, May & June.

Automatic pH Control In Acid Waste Treatment

Exchange Lemon Products Co., Covina, Calif., discharges its wastes into a county sewer and is required to reduce the wastes, which have a pH ranging from 4.5 to 3.0, to a pH greater than 6.0 before discharging them into the sewer. This is done by adding lime. Wide variations of pH and of volume made it impossible to control the lime dosage properly by hand, and it now is done automatically, the pH of the effluent being maintained between 6.0 and 8.0. A Beckman Electrode Immersion Assembly is mounted near the outlet. The pH electrodes are connected to a pH indicator, which in turn is connected to a recorder with pneumatic controller, which regulates the feed rate of lime into a constant flow of water into the process waste.

"Automatic pH Control Replaces Manual Operation for Acid Waste." By Peter L. Shugart, *PUBLIC WORKS*, July.

Sewerage at 10,000 Feet Elevation

The sewerage system of Leadville, Colo., is between 9,950 ft. and 10,220 ft. above sea level. The present population is 4,100, but it has been as high as 35,000 when metal mining and refining were booming, as they may again. A sewer system and treatment plant were constructed recently and the design of the latter was influenced considerably by the altitude and climate. Because the temperature has remained below zero for an extended period of time, and the depth of snow would interfere with the operation of open structures, the control building was given sufficient length to enclose the grit channel and comminutor within its lower level. The concrete walls of the 30-ft. primary clarifier were extended upward to enclose it and prevent snow from blowing into it, and an interior walkway with handrail was constructed to facilitate maintenance. All pumps and controls and the digester heater are located on the lower floor of the two-level building, which contains an office and garage on the upper level. The building is heated by a radiant heat system supplied from the digester heater. The 32-ft. digester was insulated with 2 in. of spun glass covered with cement, and pipes were installed in its walls to warm them.

"Two-Mile-High Sewage Collection and Treatment Works." By Robert Q. Boyce. *PUBLIC WORKS*, July.

Design Criteria For the Semitropics

Many design criteria suitable for colder climates may be modified for the semitropics, permitting reduction of size and cost of installations. For primary sedimentation, a detention time of 1½ or 2 hrs. seems adequate; longer detention may even decrease efficiency. Intermittent sand filters will provide economical treatment for small installations requiring a high degree of bacterial and organic removal; loadings of 175,000 to 400,000 gpad of domestic sewage have been treated effeectively on Florida sands, by making two applications a day. A depth of sand of 18 in. is sufficient for sands smaller than 0.45 mm. For trickling filter media, the sodium sulfate soundness test is unnecessary where penetrating frost rarely occurs. The rate of BOD removal by trickling filters is greater in the semitropics, and filters may be made 4 ft. deep instead of the standard 6 ft. Loadings on standard-rate trickling filters as high as 7.5 to 20 mgad are considered practicable; but at more than 10 mgad, ponding trouble may occur. Sludge drying areas may be substantially less than in colder climates; a plant using only 0.30 sq. ft. per capita obtained forkable sludge in 5 to 7 days.

"Sewage Plant Design Criteria for the Semitropics". By Thomas de Saussure Furman, Assoc. Prof of C. E., Univ. of Florida, *Sewage and Industrial Wastes*, June.

Reclamation of Sewage Effluents

A study of the reclamation of water from sewage by spreading was conducted for 2½ yrs. by the San. Eng. Research Laboratory of the University of California, and optimum methods of operation learned. The soil on which the test was conducted was a fine sandy loam. In such soil a percolation rate of at least 0.5 acre-foot per acre per day can be expected when spreading a final effluent. The optimum method is to spread continuously for a month, preferably with a liquid containing large amounts of organic matter; then allow the basin to rest until it is air dried and cultivate the dry soil. Following this preliminary treatment, continuous application of a final effluent may be carried on for as long as six months. Resting and cultivation may then be repeated. Measures for control of mosquitoes are desirable.

"Sewage Effluent Reclamation for Industrial and Agricultural Use." By Arnold E. Greenberg and Jerome F. Thomas, San. Eng. Research Lab., Univ. of California. *Sewage and Industrial Wastes*, June.

Other Articles

Sanitary Fill in Cold Climates. "Cold Weather Is No Obstacle to Fill-and-Cover". By City Engineers of Bismarck, N. D. and Eau Claire, Wis. American City, June.

"**Sludge Digestion** with Bacillus Endorhythmos, Optimums pH for". By C. E. Keefer, T. C. Buck, Jr., and Hester Hatch, Baltimore City Health Dept. Sewage and Industrial Wastes, May.

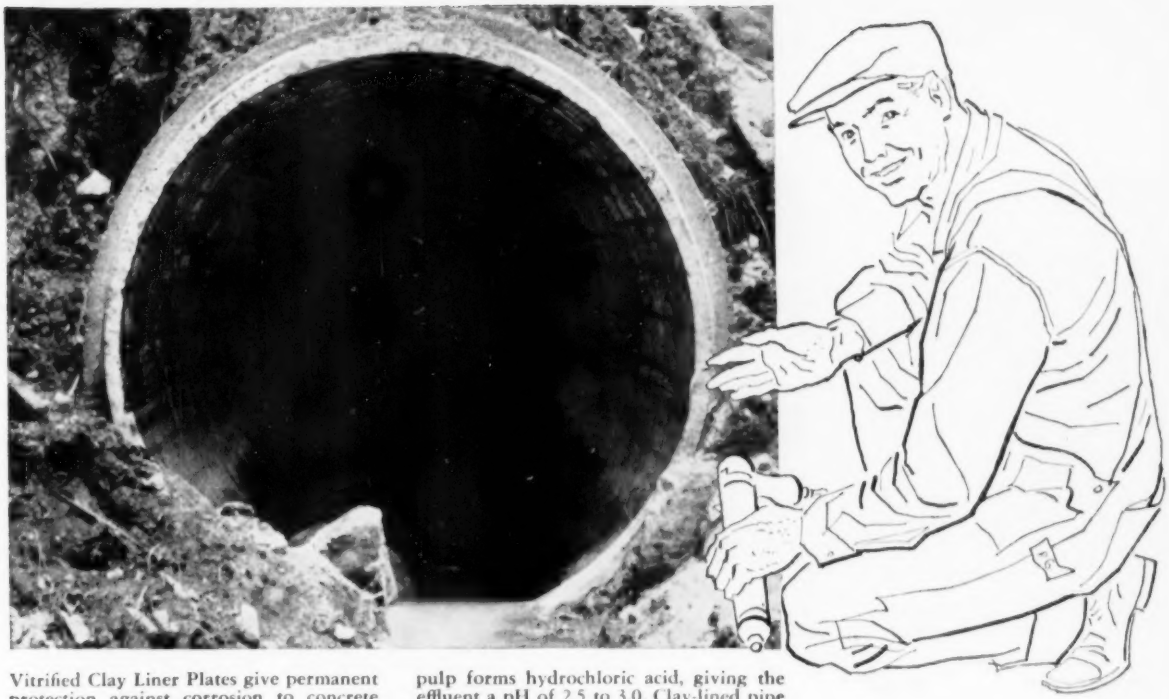
"**Paper and Pulp Waste** Reduction by Mill Improvement". By R. M. Drummond, International Paper Co. Sewage and Industrial Wastes, May.

"**Fungi** in Polluted Water and Sewage". By William Bridge Cooke, U.S.P.H.S. Sewage and Industrial Wastes, May and June.

"**Concrete Pipe** and Cement Blocks Used for Sewer Relocation Project". By Frank L. Rice, Asst City Engr., Rutland, Vt. Public Works, July.

"**Radioactive** Contaminated Laundry Waste and Its Treatment". By Ernest F. Gloyna, Assoc. Prof of C. E., Univ of Texas. Sewage and Industrial Wastes, June.

"**Syndets** in Municipal Sewage, More Data On". By Don K. Croft and Samuel D. Faust. Water & Sewage Works, June.



Vitrified Clay Liner Plates give permanent protection against corrosion to concrete discharge lines leading from an Alabama paper mill. Chlorine used to bleach wood pulp forms hydrochloric acid, giving the effluent a pH of 2.5 to 3.0. Clay-lined pipe replaces a severely corroded line that failed despite a "protective" coating.

VITRIFIED CLAY LINER PLATES

protect concrete pipe from corrosion

Whether it's the acid waste of an industrial process . . . or the acid that forms from ordinary sewage . . . Vitrified Clay is *completely unaffected.* That's why engineers specify Clay Pipe for lines that must give permanent, corrosion-free service. Behind this overwhelming preference for Vitrified Clay lies the fact that it can't rust, corrode, flake off, or soften regardless of the chemical activity of sewage liquids and gases. That's why Vitrified Clay Pipe is *guaranteed for 50 years.* It never wears out!

NATIONAL CLAY PIPE MANUFACTURERS, INC.

1520 18th St. N.W., Washington 6, D. C.

206 Connally Bldg., Atlanta 3, Ga.
100 N. LaSalle St., Rm. 2100, Chicago 2, Ill.
703 Ninth & Hill Bldg., Los Angeles 15, Calif.
311 High Long Bldg., 5 E. Long St., Columbus 15, Ohio

Vitrified CLAY PIPE

C-454-A

Get full details of this month's products . . . mail your Readers' Service card today.

A Test of Methods of Backfilling Trenches

This test conducted by the District of Columbia, Department of Highways is reported in Highway Research Abstracts.

The test project was a sewer trench 300 feet long, 8 feet deep and 2 feet wide. Three basic test sections were established, each 100 feet long. In the first section the backfill was made with borrowed bank-run gravel, end-dumped from trucks into the trench and jetted. In the second section the soil removed from the trench during construction (micaceous sandy-silt) was replaced in 9-inch loose lifts, each lift being compacted to an average of 93 percent of Standard AASHO maximum density. In the third section the removed soil was bladed back into the trench to within four feet of ground surface, jetted and the remaining trench filled by compacting 9-inch loose lifts with pneumatic tamps to an average of 93 percent maximum density.

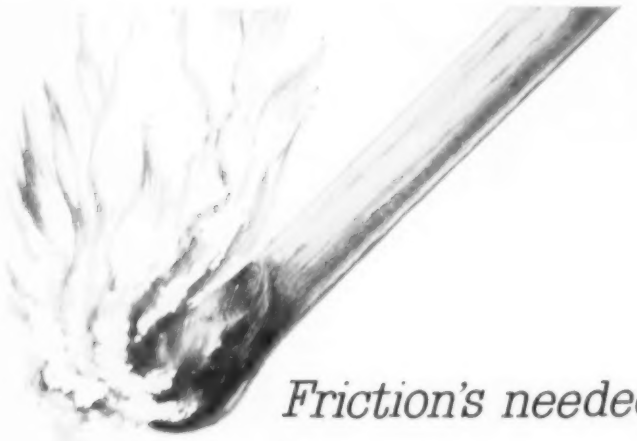
Sect.	Backfill Material	Method of Compaction	Average % of Maximum Density	No. of Density Tests	Est. Costs Per Cubic Yard
1	Gravel	Jetted	81	18	$4.28
2	In-place soils	Tamped	93	26	1.75
3	" "	Jetted	77	5	1.25
3	" "	Tamped	93	17	1.75
5	Gravel	See text	95	11	4.86

In the jetted sections test pits were opened and in-place density tests using calibrated sand were made as the pits were carried down; in the tamped sections tests were made as the backfill was brought up. Complete time records were kept for all phases of the backfilling operations and these form the basis for the cost estimates in this report. The results of tests and of the cost analysis for the test sections are summarized in the table herewith. The last line shows results based on vibrating 15-foot long sections of gravel-filled and jetted trench.

The jet-tube used throughout the test sections was a 30-inch long, ¾-inch water pipe with a closed-pointed end having four longitudinal rows of three jet holes each. The holes were made by drilling through the pipe with a 3/16-inch bit and were spaced on 6-inch centers within the rows. Undrilled extensions were coupled on for ease in handling.

In jetting, the tube was shoved down to the top of the pipe and left there until water surfaced around the tube, then raised a foot and held until water again surfaced. Following this procedure the tube was worked in one foot lifts to the trench top. The tube was advanced in 12-inch moves along the trench and was zig-zagged to the alternate one-third-width points. This pattern was followed in all test sections and it was noted that it took from three to four times longer to jet the silts than the gravels. Water pressure was about 40 psi.

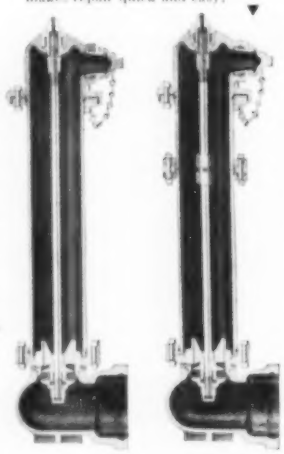
A small portable concrete vibrator was used to compact the 15-foot length of Section 5. In compacting, the vibrator tube was pushed down to the pipe-top, held, then brought up in 1-foot lifts—a procedure requiring about 5 mins.



Friction's needed for a match but it's no help in a fire hydrant

Friction causes loss of water pressure and reduces the effectiveness of fire-fighting equipment. That's why R. D. Wood Hydrants are designed to cut friction way down—and why so many communities rely on them for fire protection.

The R. D. Wood Hydrant can be furnished with breakable flange and stem coupling at extra cost. Both are built to break with a heavy blow. This saves the hydrant itself and makes repair quick and easy.



THE R. D. WOOD SWIVEL JOINT HYDRANT: All internal parts, including drain valve seat, removable through barrel • all-bronze stuffing box • completely revolving head • compression-type valve, cone shaped to prevent water hammer • automatic drain valve • bronze main valve seat screws directly into elbow with straight, not tapered threads • mechanical-joint pipe connections if specified

R.D. Wood Swivel Joint Hydrants

Public Ledger Building, Philadelphia, Pa. | Manufacturers of "Sand-Spun" Pipe (centrifugally cast in sand molds) and R. D. Wood Gate Valves

Need more facts about advertised products? Mail your Readers' Service card now.

THE "ALL AMERICAN" CITY

CANTON, OHIO CHOOSES "Flexibles" OF COURSE

Last year Canton was named an "All America" City by the National Municipal League and LOOK Magazine, being one of 11 cities so designated during 1953. It received a merit certificate for outstanding achievement in city government among other honors and recognition.

Naturally, like other modern, well-run cities, Canton uses and endorses "Flexible" sewer cleaning equipment. Pictured is one of its "Flexible" Bucket Machines in the process of getting a sizeable heap of mud and other obstructions out of a typical sewer manhole. Floyd Walters is operating, Ralph Swinehart is dumping the bucket, Don Skotnicky is standing by. They are working in safety and with dignity above ground on the street level... instead of "in the sewers," as was required of sewer maintenance crews in the years "Before Flexibles."

"Flexibles" cut sewer cleaning costs—permit preventative maintenance to be carried out—operate in all weather. There is a model for every need. We invite the opportunity to give your city an "on the job demonstration."

Write for our **FREE** *Catalog*

Flexible SALES CORPORATION

3786 Durango Ave., Los Angeles 34, Calif.

(DISTRIBUTORS IN PRINCIPAL CITIES)

AMERICA'S LARGEST LINE OF PIPE CLEANING TOOLS AND EQUIPMENT

from one to 150 cubic yards per hour

If you process and sell your sludge cake . . . and if you don't, you should . . . you need a Royer Sludge Disintegrator. This efficient machine takes sludge cake from the drying beds and shreds, pulverizes and aerates it into a readily sold fertilizer. A steady income from its sale replaces the usual expense of sludge disposal.

And there is a Royer available to take care of your needs . . . from 1 to 150 cu. yards. per hr. The small Junior is easily fed by one man hand shoveling . . . the huge NSYP-E is built with extension hopper for tractor bucket feeding . . . others in capacities between these ranges. Write for details.

Also available in the 150 cubic yard per hour capacity is an "over-the-road" model, powered with a 36 HP air cooled Wisconsin gasoline engine and mounted on four 6.00x16 tires, with tow bar and automotive steering (Model NSYP-E G).

ROYER foundry & machine co.

157 PRINGLE ST., KINGSTON, PA.

ROYER

Thousands use our Readers' Service card to keep up to date... do you?

PUBLIC WORKS DIGESTS

THE HIGHWAY AND AIRPORT DIGEST

Virginia's New Highway Specifications

The Virginia Dept of Highways in April issued a revised edition of its road and bridge specifications The preparation of this has occupied about a year, and was shared in by all branches of the Division. Suggestions were asked and received from trade associations representing contractors, material producers and others having a practical interest in the operation of the specifications in the field. Equipment distributors and manufacturers made practical contributions. The first consideration was to simplify the language, eliminating shopworn phrases and "gobbledygook"; make the specifications not only technically accurate but definite, clear and unambiguous; equitable to all parties; with sufficient latitude to permit the use of new methods and improved equipment, specifying only end results and leaving the manner of obtaining them to the ingenuity of the man in the field. One of the many changes in wording was substituting the word "place" for "pour" in referring to concrete; concrete that can be poured is too wet for present day practice. Not only the specifications were revised, but the standard plans also, to correlate plans and specifications.

"Pruning Out Gobbledygook in Highway Specification Writing". By D. B. La Prade, Asst. Chief Engineer & Aide, Dept. of Highways. *Better Roads*, June.

Controlling Curb Parking

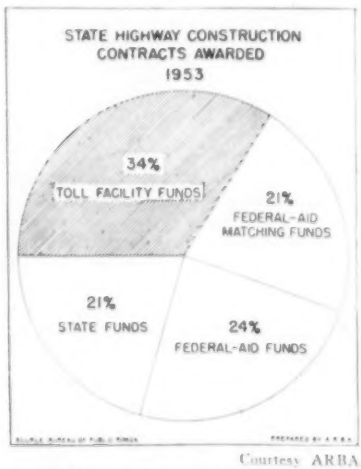
Off-street parking spaces would seem to be the best solution of the parking problem, but more or less curb parking will continue and this should be so controlled, as should also off-street parking when available, as to serve the best interests of parkers and merchants generally. There are in general four classes of parkers: 1—The errand parker, whose parking time is usually 30 min. or less. 2—The shopping parker, one or two-hour parking time. 3—Employees—four hours or more. 4—Loaders—variable time, often only a few minutes. An employee parker thus prevents the use of his space during the day by about 12 errand parkers or three shopping parkers. Errand parkers should be accommodated nearest to the shopping district, shopping parkers next closest and employee parkers the farthest. The relative number of parking spaces allotted to each class in a given city or district should be determined by a traffic survey. To secure the desired use of each space, the parking meter seems to offer the best self-enforcing control. Time-limit signs appear to be ineffective without rigid enforcement.

"Let's Control Curb Parking Space". By Harold L. Michael, Highway Research Project, Purdue University. *PUBLIC WORKS*, July.

Base Enveloping With Asphalt in Alberta

Water-saturation control in pavement construction by use of asphalt membranes as water barriers has been demonstrated successfully in the United States for several years, but the complete enveloping of highway grade materials in a recent development made possible by the availability of an asphalt membrane lining used for lining canals and reservoirs. The first use of the process in Canada was on 2,000 ft. of Highway No. 2 across a waterfilled area in Calgary, Alberta, laid last fall. The existing 2-lane grade was widened and raised by a fill of pit-run gravel, covered with sand and rolled to a smooth finish. The special asphalt was then applied by six passes of the distributor, giving a total thickness of ½ in., or 2 gal. per sq. yd. The entire area was closely checked for weak spots, and then covered with 3 in. of ⅞ in. crushed gravel, except for a 2 ft. width along each edge, which was left exposed to provide an overlap bond with the slope membrane. On the crushed gravel the base course proper was laid in the usual manner, the shoulder slopes being shaped by hand and covered with crushed gravel to give a smooth surface for the membrane. Then an asphalt membrane was applied as before, covering the 2 ft. overlap and extending up the slope and for 2 ft. onto the crushed gravel top. A 2 in. thickness of asphaltic wearing surface laid on top of this completed the entire enveloping of the road with asphalt.

"Base Enveloping With Asphalt". By G. R. Pinchbeck, Asph. Engr. *Roads and Engineering Construction*, May.



Courtesy ARBA

● **STATUS of 1953 highway construction showing contracts awarded.**

Photography in Highway Work

Photographs that illustrate the needs and accomplishments of highway departments are nearly indispensable in presenting the highway story to the public. Photography is useful in safety and accident prevention activities, in training new employees and presenting refresher

Why a county foreman says . . .

"It pays to standardize on CAT* equipment"

THIS Caterpillar No. 80 Scraper and D8 Tractor are 6½ years old, and still saving money for the taxpayers of Butte County, Calif. Every year they move about 100,000 yards of earth and build about 20 miles of road. And there's no "off season" for this husky yellow team. In the winter they remove 60 to 85 miles of snow — *deep* snow that has reached 15 feet at Stirling City.

On this job they're moving 30,000 yards of red clay and lava ash on a road widening and realigning project in Butte County. R. L. Hawks, road construction foreman, says, "They do more work with less trouble; there's no doubt that in the long run they can't be beat. We find it pays to standardize on Cat equipment."

The burly No. 80 Scraper hauls a heaped load of 20 yards. Being cable operated, it loads smoothly and can pump "dead" material. It gets rid of its load quickly and evenly with positive, fast-responding ejection. And the push block extends well behind the tires for powerful, in-line pusher action.

Like all Caterpillar machines, the No. 80 Scraper is built to stay on the job and out of the shop. Rugged construction and durable, high tensile steels mean that it will earn its keep for many years.

Your Caterpillar Dealer—who gives skilled service on the equipment he sells — will gladly give you an on-the-job demonstration of the Cat Scraper that fits your needs. Give him a call today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

*Both Cat and Caterpillar are registered trademarks

NAME THE DATE . . .
YOUR DEALER
WILL DEMONSTRATE

courses, in connection with lawsuits, and in illustrating record files. Some highway departments have a regular system for securing photographs. In this article a number of state and county highway officials tell of their systems, or more or less unsystematic methods, for obtaining photographs. New York State, for example, has a central photography bureau, and most of the 10 highway districts have a man assigned to photography.

"Take Photographs Systematically" *Better Roads,* June.

Soil-Cement In Pennsylvania

In the northwestern district of Pennsylvania a soil-cement road was laid in 1940 which is still giving excellent service. Since then, the use of this material has increased, more than 100,000 sq. yd. having been laid in 1953, with an average width of 17 ft. at a cost of about 90¢ per sq. yd. Covered with a 1-inch course of bituminous surface, the cost averaged about $20,000 a mile. This year's work includes widening of existing highways and stabilizing shoulders, as well as new construction. The plans of the department include setting up central mixing equipment at the source of borrow material and hauling the mixture, in the case of road widening.

"Pennsylvania Extends Use of Soil-Cement". By L. D. Lambert, Asst. Maint. Engr. *Better Roads,* June.

Foamed Asphalt For Highway Work

A small amount of water present in the heavier grades of bituminous materials when they are heated above the boiling point of water will cause them to expand rapidly. Until recently, all efforts were devoted to prevent this foaming, but engineers of Barrett Division have found that it is advantageous in some paving processes. Properly adding about 20 gal. of water per 1,000 gal. of paving asphalt used in the construction of penetration macadam causes the asphalt to foam vigorously as it leaves the spray base. This is found to cause the aggregate to be coated more uniformly and thoroughly all the way down to the base It also retards the set of the asphalt, permitting better consolidation by rolling, and causes better adhesion of choke stone in the surface voids

"A New Use for Foamed Asphalt". By George E. Martin, *PUBLIC WORKS,* July.

Other Articles

"County Road System, Improving a". (Ramsey Co. Minn.) using hot mix asphalt for both patching and resurfacing 450 miles. By Henry G. Luecke, Supt of Equip. Public Works, July.

"Equipment Rental System Gives Us Extra Miles of Roads". By Pat Thomson, County Engr. Douglas Co. Washington. Better Roads, June.

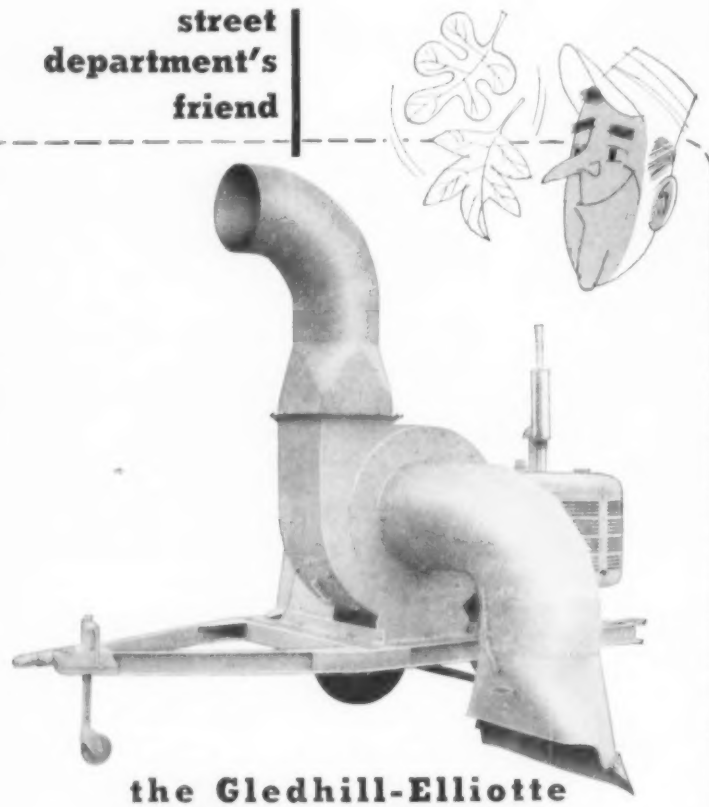
Salvaging Obsolescent Roads and Bridges. "Salvage Program Progresses in Alabama". By W. G. Pruett, State Highway Div. Better Roads, June.

• • •

Better Highway Lighting Advocated

In a recent talk, David H. Stevens, chairman of the Maine State Highway Commission said: "There is a need for better lighting of highway intersections. While lighting has been installed in some compact areas at intersections in the past, it is believed that lighting should be considered to a greater extent for intersections that are not necessarily in a compact section of municipalities."

street department's friend



the Gledhill-Elliotte
LEAF LOADER

When the leaves come tumblin' down, the street department will own the busiest machine around town.

Leaves, twigs and other curb accumulated refuse simply disappear in the leaf hungry snout and are swiftly devoured by high speed, balanced, rotating fan blades. An independent, powerful motor drives the suction apparatus. Formerly the Elliotte "Sucker Upper", hundreds of these machines have proved their worth to street maintenance crews. It is now a Gledhill owned and manufactured device.

Don't get caught with your leaves down! Better get full information and prices right away!

THE GLEDHILL ROAD MACHINERY CO.
GALION . OHIO

Get full details of this month's products . . . mail your Readers' Service card today.

HOW TO BUILD A

Concrete Sidewalk

WHAT are the main requirements for a good sidewalk? It should be durable; smooth without being slippery; easy to clean; and pleasing to the eye.

First step in building a sidewalk is to prepare the base. If the soil is well drained, the concrete can be placed directly on it after the soil has been compacted with a tamper. If the soil isn't well drained, a 4-in. subbase of well-compacted, clean, coarse gravel or cinders should be provided.

The thickness of concrete walks usually varies from 4 to 6 ins. If the walk is to be used only as a footpath, 4 ins. is thick enough, but if automobiles or other heavy vehicles are likely to be moved over the concrete, the thickness should be 6 in.

Steel forms, either 4 ins. or 6 ins. high are desirable for general use and are especially useful on curves and for driveways; or 2x4's, held in place by stakes, can be used. The top edges of the forms serve as guides in leveling off the fresh concrete. In general, it is good practice to build walks about 1 in. above grade so they will be well drained. The walk should be sloped about ⅛ in. per foot toward one side for drainage. Sidewalks are best built in one-course, continuous construction. This means that the full thickness of the concrete is placed at one time, using the same mixture throughout.

Making quality concrete is a simple procedure if a few basic fundamentals are observed. In building a sidewalk, for example, care should be taken to see that the concrete is: (1) carefully proportioned; (2) properly mixed and placed; and (3) adequately cured.

Careful proportioning means that the concrete mixture should not contain more than 5 gal. of water per bag of portland cement when the sand is in an average wet condition. If the sand is very wet, the amount of water can be reduced to 4¼ gal.

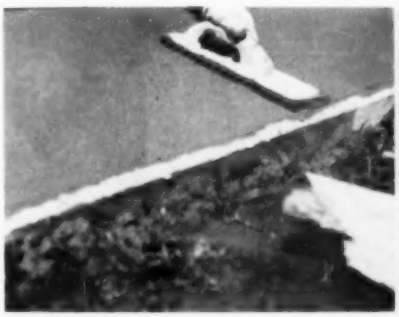
The trial batch for sidewalks should consist of one part portland cement by volume to 2¼ parts sand and 3 parts gravel or crushed stone having a maximum size of one inch. If this mix is too stiff, the amount of sand and gravel should be reduced in the next batch. If the mix is too wet, small amounts of sand and gravel should be added in the proportion of 2¼ parts sand to 3 parts gravel. If the mix is coarse and difficult to work, the amount of sand should be increased. *Never change the cement and water content.*

The concrete should be thoroughly mixed and then placed directly into the previously prepared forms. During the placing process, the concrete should be well spaded along the forms. After the concrete is placed, a strikeboard resting on the edges of the side forms is passed across the forms in a saw-like motion, leveling the concrete. If freezing weather catches you in the midst of concreting, the mixing water should be heated so the concrete is between 60° and 80° F. when placed. Calcium chloride at the rate of 2 pounds per bag of cement may be used. Materials containing ice or frost should never be used in concrete. And concrete should not be placed on frozen ground or in forms containing frost or ice.

To provide for expansion and contraction of the concrete during the summer and winter months, expansion joints ½-in. in thickness should be placed where the new walk meets such fixed objects as foundations, street lights, fire hydrants, driveways, etc. Expansion joints should also be provided where sidewalks intersect and at curbs.

● **HOW WIDE?** It depends on the use. A good width for the main house entrance is 4 to 5 ft. Side or rear walks can be 1½ to 3 feet in width.

● **THE MIX** is 1 portland cement to 2¼ sand and 3 parts gravel or crushed stone, maximum size 1½-in. Use 5 gals. of water per bag of cement.



● **FINISH** with a wooden float a few hours after concrete has been placed but is still workable. This float smooths the top but leaves a rough surface.

● **METAL** trowel is used to complete the finishing job. A small edging tool run along the side forms give the walk a pleasing and finished appearance.

KOHLER
ELECTRIC PLANTS
Independent Source of Electricity

On-the-job electricity saves man hours

Use portable Kohler Electric Plants for time-saving efficiency in maintenance and repair of sewage and water pipes, streets, overhead wires. Provide electricity anywhere, any time for floodlights, power tools. Rubber-tired hand cart available . . . Use Kohler automatic stand-by plants to keep essential equipment running in sewage treatment and water filtration plants when storms or accidents cut off central station power. Sizes 1000 watts to 30 KW. Write for folder 9-S.

MODEL 1-5M25, *1500 watts, 115 volt AC. Manual control. Also 115 volt DC. Other sizes 500 watts to 30 KW.*

Kohler Co., Kohler, Wisconsin. Established 1873

KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

MATCH THIS SAFETY RECORD!

OVER 26 YEARS WITHOUT A FATALITY

The City of Minneapolis works very hard to maintain its 26-year safety record of no fatalities at organized school crossings. Look at the intensive program behind this record:

It takes crisp signs to command the obedience of traffic, so every fall new or freshly painted signs go up at or near every school crossing.

Important, too, police and school patrol supervise traffic at these crossings; newly painted lines go down on streets yearly; obstructive trees and shrubs are trimmed to permit full visibility of signs, and every summer sign support posts are repainted.

Let Lyle school signs help you promote such safety in your community. Write today for illustrated Lyle sign catalog.

LYLE SIGNS, INC.
2720 UNIVERSITY AVENUE, S. E.
MINNEAPOLIS 14, MINNESOTA

Contraction joints should be provided at about 5 ft. intervals. These can be made with a trowel by cutting grooves about 1/3 the depth of the slab. These grooves can then be finished with a grooving tool.

Several hours after the concrete is placed, or when the sheen or shiny film of water has disappeared, the walk should be finished with a wood float to produce an even, gritty surface. New concrete must be protected from freezing, and should be kept above 50° F. for at least three days after placing.

To assist in curing, a covering of moist sand, earth, straw, burlap or similar material should be put on the concrete as soon as it has become sufficiently hard to resist marring. This covering is kept continually moist for at least 3 days, and may then be removed and the sidewalk put to use.

• • •

Waterborne Disease Outbreaks Reported by Public Health Service

Eleven outbreaks were reported during 1953 in which the epidemiological or laboratory tests indicated that water was the vehicle of infection; and in five others the possibility of water transmission was considered.

Three of the 11 outbreaks were typhoid fever; one was demonstrated or confirmed by laboratory tests and the others by epidemiological evidence. In Ohio a group of 9 persons with typhoid gave a history of having used water from wells which had been contaminated by excretions of a typhoid carrier. The typhoid bacillus was isolated from the water of one well by use of the membrane filter technique. In Kentucky 13 cases of typhoid fever followed eating in a restaurant where water from wells was shown to be polluted. In another state 2 members of a family who swam in a river subsequently developed typhoid fever.

Three waterborne outbreaks of bacillary dysentery were reported. In one, 450 cases occurred in a school where the well water supply became contaminated by seepage from a septic tank. Another occurred in a boys' camp where the chlorinator attached to the water system failed when lightning put the equipment out of order. The third outbreak occurred in a resort area where the well water supply was found polluted.

Unspecified types of gastro-

Thousands use our Readers' Service card to keep up to date . . . do you?

enteritis occurred in five outbreaks in which cross connections, back siphonage, and polluted wells were associated with the occurrence of cases.

The five outbreaks in which water transmission was considered a possibility included 4 of infectious hepatitis, 1 in each of 4 states, and an outbreak of gastroenteritis which occurred aboard a train enroute from Chicago to Florida.

It is noteworthy that no outbreak was reported in which a city water distribution system was involved or at fault.

• • •

Intermediate Bituminous Mixes Will Help Stretch Funds

Between road-mix bituminous construction, and high-type mixes, there is a vast field of "intermediate" mixes, which can help materially to stretch the funds available for road construction and maintenance. Hundreds of jobs, and thousands of miles of surface now in use testify to the low cost and high quality of these "intermediate" specifications. Here is a simple, flexible solution for many cases where there are inadequate funds to provide high-type construction.

There is no question about the quality, load resistance, and long life of high-type bituminous pavements. These are derived from four basic factors: 1. The engineer is free to select any bitumen without being restricted to the light bitumens required for road-mix processing. 2. The aggregate is dried to controlled limits (eliminating probably the greatest cause of pavement failure). 3. The aggregate is heated (permitting use of heavy bitumens). 4. The gradation of the aggregate is accurately controlled.

All four steps are necessary to produce high-type mixes, but each one adds to the quality of the final pavement. On the other hand, a dryer and a mixer set-up for intermediate-types offers the advantage of the first three factors, namely: Free choice of any bitumen; controlled drying; and heating the aggregate. Complete, mechanical gradation control of the dried aggregate is not employed. Nevertheless, much quality is added. As far as cost is concerned, some show lower cost per mile with central plant intermediate-mixes than with road-mix, and these comparisons are based on full seasons with each method. A number of factors contribute to the lower cost of intermediate - plant mix. These include:

SAFE-T-CONE
ALL-RUBBER TRAFFIC GUIDES ®

Patent Pending

for EFFICIENT TRAFFIC CONTROL

During emergency street repair or the traffic rush hour . . . Safe-T-Cones are constantly on duty . . . guiding traffic safely thru congested areas. Used by traffic engineers from coast to coast, Safe-T-Cones are the answer to modern traffic problems. Available in two sizes, 18 inch and 28 inch, painted or reflectorized.

Write for complete information.

RADIATOR SPECIALTY CO.
CHARLOTTE, NORTH CAROLINA
IN CANADA: RADIATOR SPECIALTY CO., LTD., TORONTO

SAFE-T-CONE ®

2011

REED TRADEMARK *Announces . . .*
. . a revolutionary
New HINGED PIPE CUTTER

You can cut off 8" pipe, *in*
less than 5 minutes

send for free literature on these amazing cutters for standard steel and cast iron pipe from 2½" to 12".

MAIL THIS COUPON TODAY

REED MANUFACTURING CO.
ERIE, PA.

Without obligation, please send me descriptive literature on your new hinged pipe cutters.

Name _____
Company _____
Street _____
City _____ State _____

Now's the time to mail this month's Readers' Service card.

Longer Season—Central plant operations, with mechanical drying, increase the length of the working season from 30 to 40 percent. Hot-mix can be mixed and laid at the lower temperatures of spring and fall, since the mix from the central plant has the moisture removed.

Bitumen Savings—The use of heavy cutbacks, heavy asphaltic oils, or asphaltic cement used with hot-mix reduce or eliminate solvents required for mixing and spreading road-mix, thus saving on bitumen required. Hot-dry aggregate permits more thorough coating with less bitumen. No aeration is required to remove solvent after mixing.

Machine Laying

Machine Laying—The fact that the plant-mix material can be laid with a finishing machine provides a controlled thickness, uniform density, less segregation, straight finished mat edges and a smooth riding surface; and allows traffic to be maintained. Being laid with a finisher, it requires less rolling. The base may be prepared and primed, so that work can be resumed immediately after a rain. Construction can be carried on under traffic, without detours.

Aggregate—Even if pit run material is used, with no attempt at size control, the engineer has gained the advantage of drying and heating, and is free to choose a heavy bitumen. Usually, of course, the aggregate is crusher-run with a maximum size particle. This may be used as a single aggregate. Where the aggregates are available in two or more sizes, they can be blended at the cold feed with a high degree of accuracy, using a multiple gate feeder beneath a divided stockpile and bulkhead arrangement, or with the same feeders mounted under a standard compartmented bin. Constant aggregate proportioning is maintained with these feeders, and from here on the material is handled as a composite.

Samples of the dried aggregate give a quick check on the percentage of sand, and indicate the need for adjustment, if any is required. Control of the sand fraction is most important for production of a consistent quality of mixture. No asphalt plant (including the highest type) has any control over the gradation in the fines or sand bin. Since it is not practical to attempt to screen over an extremely fine screen, the only control of the fine bin gradation is obtained by careful blending coarse and fine sands at the cold feeders. Thus the dryer-mixer combination has the same accuracy of sand gradation as the highest-type-plants.

While the dryer-mixer combination is not a substitute for a high-type-plant with a gradation unit, many users can add further quality by blending several sizes in the cold feed. The feasibility of this operation is dependent upon the materials available at the aggregate source. Mechanically interlocked multiple blending is simple. Bins with 2, 3, or 4 compartments and separately adjustable proportioning controls are readily available.

Summarizing, the oustanding advantage of this type of bituminous construction is its low cost. The tests and jobs of many highway engineers show that its use can be greatly enhanced by a more flexible choice of bituminous mixes. Failing to consider intermediate mixes may mean failing to produce the highest quality possible with limited funds.

This material is abstracted from a paper by E. H. Holt of the Barber-Greene Co. at a National Highway Users Conference Meeting.

DON'T LET OLD MAN WINTER SLIP UP ON YOU!

. . . . . GET REAL CONTROL OF ICE CONTROL!

PUT HI-WAY SPREADING EQUIPMENT TO WORK

HERE'S THE "TWIN POWER" MODEL E—THE NEW LEADER IN MATERIAL SPREADERS GIVES YOU:

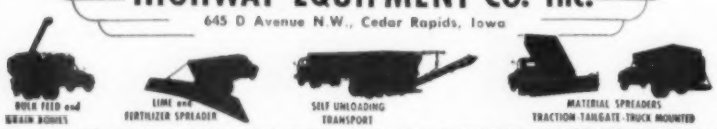
- A metered spread
- Adjustable width of spread 3' to 70
- Forward or reverse spreading without shifting
- Cab controlled operation
- Spreading at speeds up to 35 MPH
- Conveyor capacity controlled by positive drive shaft drive
- Distributor Discs driven hydraulically
- Accurate spreading of salt, sand, cinder, calcium chloride

Get more information on the complete *New Leader line* of spreaders. There's a size for every need as well as gas engine or power take off driven models.

HI-WAY MODEL DD—an all-season, low-cost portable tail gate spreader mounts on standard dump body, *quickly*, powered by rugged gas engine.

HIGHWAY EQUIPMENT CO. Inc.

645 D Avenue N.W., Cedar Rapids, Iowa


BULK FEED and GRAIN BOXES
LIME and FERTILIZER SPREADER
SELF UNLOADING TRANSPORT
MATERIAL SPREADERS TRACTION-TAILGATE-TRUCK MOUNTED

MANUFACTURER OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS AND BULK DELIVERY EQUIPMENT.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

DIRECTORY Consulting Engineers

ABRAMS AERIAL SURVEY CORPORATION

Photogrammetric Engineers for more than a third of a century

Aerial Photography — Atlas Sheets — Mosaics — Plan and Topographic Maps—Profiles—Infra-red Foliage Analysis

Photo-interpretation Instruments

618 E. Shiawassee St. Lansing, Michigan

ALBRIGHT & FRIEL INC.

Consulting Engineers

Water, Sewage and Industrial Wastes Problems
Airfields, Refuse Incinerators, Dams
Power Plants, Flood Control
Industrial Buildings
City Planning, Reports, Appraisals and Rates
Laboratory

121 SOUTH BROAD ST. PHILADELPHIA 7

ALVORD, BURDICK & HOWSON

Engineers

Water Works, Water Purification, Flood Relief, Sewerage, Sewage Disposal, Drainage, Appraisals, Power Generation

20 No. Wacker Dr. Chicago 6, Ill.

MICHAEL BAKER, JR., INC.

THE Baker Engineers

Civil Engineers, Planners, and Surveyors

Airports, Highways, Sewage Disposal Systems, Water Works Design and Operation—City Planning—Municipal Engineering—All types of Surveys

Home Office: Rochester, Pa.
Branch Offices:
Jackson, Miss. Harrisburg, Pa.

BANISTER ENGINEERING CO.

Consulting Engineers

POWER PLANTS, WATERWORKS, CITY PLANNING, RURAL ELECTRIFICATION, SANITATION, WASTE PROBLEMS, AIRPORTS, STREET IMPROVEMENTS

1549 University Ave.
St. Paul 4, Minn.

BARKER & WHEELER

Engineers

Water Supply, Sewerage, Sewage Disposal, Power, Public Utility and Industrial Valuations and Rates

36 State Street, Albany 7, N. Y.
11 Park Place, New York City 7

HOWARD K. BELL

Consulting Engineers

G. S. Bell C. G. Gaither J. K. Latham

Water Works — Sewerage Disposal
Water Purification — Sewerage
Swimming Pools — Refuse Disposal
Industrial Wastes

553 S. Limestone St. Lexington, Ky.

BLACK & VEATCH

Consulting Engineers

Water — Sewage — Electricity — Industry

Reports, Design, Supervision of Construction Investigations, Valuations and Rates

4706 Broadway Kansas City 2, Missouri

CLINTON L. BOGERT ASSOCIATES

Consulting Engineers

Clinton L. Bogert — Ivan L. Bogert
Donald M. Ditmars — Robert A. Lincoln

Water and Sewage Works

Refuse Disposal — Industrial Wastes
Drainage — Airfields — Flood Control

624 Madison Ave., New York 22, N. Y.

BOWE, ALBERTSON & ASSOCIATES

Engineers

Water and Sewage Works
Industrial Wastes—Refuse Disposal—Municipal Projects
Airfields—Industrial Buildings
Reports—Designs—Estimates
Valuations—Laboratory Service

110 William St., New York 38, N. Y.

BROWN ENGINEERING CO.

Consulting Engineers

Waterworks, Sewage Disposal, Airports
Street Improvements, Power Plants
Electric Distribution, Rates

K. P. BUILDING DES MOINES, IOWA

BROWN & BLAUVELT

Consulting Engineers

Railroads — Water Supply
Highways — Sewage Disposal
Bridges — Industrial Plants
Airports — River Developments

Telephone: Lexington 2-7581

468 Fourth Ave., New York 16, N. Y.

BUCK, SEIFERT AND JOST

Consulting Engineers

(FORMERLY NICHOLAS S. HILL ASSOCIATES)

Water Supply — Sewage Disposal
Hydraulic Developments
Reports, Investigations, Valuations
Rates, Design, Construction, Operation
Management, Chemical and Biological Laboratories

112 East 19th St. New York City

BURGESS & NIPLE

Consulting Engineers

Established 1908

Water supply, treatment and distribution
Sewage and industrial wastes disposal
Investigations, reports, appraisals, rates
Airport, Municipal Engineering, Supervision

584 E. Broad Street Columbus 15, Ohio

RALPH H. BURKE, INC.

Consulting Engineers

Traffic Studies — Underground Garages
Parking Structures — Grade Separations
Expressways, Airports and Terminal Buildings
Shore Protection — Municipal Engineering
Parks — Field Houses — Swimming Pools

20 North Wacker Drive, Chicago 6, Ill.

BURNS & McDONNELL

Consulting and Designing Engineers

Kansas City 2, Mo. — Cleveland 14, Ohio
P. O. Box 7088 — 1404 E. 9th St.

JAMES M. CAIRD

Assoc. Am. Soc. C. E.

Chemist and Bacteriologist

Water Analysts and Tests of Filter Plants
Office and Laboratory

Cannon Bldg., Broadway & 2nd St.
Troy, N. Y.

CAMP, DRESSER & McKEE

Consulting Engineers

Water Works and Water Treatment
Sewerage and Sewage Treatment
Municipal and Industrial Wastes
Investigations and Reports
Design and Supervision
Research ad Development
Flood Control

6 Beacon St. Boston 8, Mass.

CAPITOL ENGINEERING CORP.

Engineers—Constructors
Management

Water Works — Sewage Systems
Design and Surveys — Roads and Streets
Planning — Airports
Bridges — Dams

Executive Offices
DILLSBURG, PENNSYLVANIA

THE CHESTER ENGINEERS

Water Supply and Purification
Sewage and Industrial Waste Treatment
Power Plants—Incineration—Gas Systems
Valuations—Rates—Management
Laboratory—City Planning

210 E. Park Way, Pittsburgh 12, Penna.

CHAS. W. COLE & SON

Consulting Engineers

Sewerage, Sewage Treatmet, Industrial Wastes, Water Supply, Water Treatment
Airports, Industrial Buildings
Design and Supervision

Chas. W. Cole, Sr. — Chas. W. Cole, Jr.
Ralph Bushee — M. J. McErlain

220 W. LaSalle South Bend, Ind.

CONSOER, TOWNSEND & ASSOCIATES

Water Supply — Sewage — Flood Control & Drainage — Bridges — Express Highways — Paving — Power Plants — Appraisals — Reports — Traffic Studies — Airports
Gas & Electric Transmission Lines

351 East Ohio Street
Chicago 11, Ill.

COTTON, PIERCE, STREANDER, INC.

Associated Engineering Consultants

132 Nassau Street, New York 7, N. Y.
1405 W. Erie Avenue, Phila. 40, Pa.
P. O. Box 198, Hyde Park 36, Mass.
55 Carolina Rd., Gowanda, N. Y.

Water Supply, Treatment, Distribution—Sewage, Sewage Treatment, Refuse Disposal, Air Pollution, Power Plants, Incinerator Plants, Reports, Plans, Supervision—Laboratory Service

CREDLE ENGINEERING CO.

Civil Engineers

Water & Sewer Systems — Structures
City Planning — Foundations
Land Surveying — Soil Mechanics
Soil Borings — Investigations

204 E. Markham Ave., Durham, N. C.

DE LEUW, CATHER & COMPANY

Consulting Engineers

Public Transit, Traffic and Parking Problems

Railroads — Grade Separations
Major Thoroughfares — Expressways
Subways — Tunnels
Power Plants — Municipal Works

150 North Wacker Drive, Chicago 6, Ill.
79 McAllister St., San Francisco 2, Calif.

GANNETT FLEMING CORDDRY & CARPENTER, Inc.
Engineers
Water Works, Sewage, Industrial Wastes & Garbage Disposal
Roads, Airports, Bridges & Flood Control
Traffic and Parking, Appraisals, Investigations & Reports
Pittsburgh, Pa. Philadelphia, Pa.
Daytona Beach, Fla. Pleasantville, N. J.
HARRISBURG, PENNA.

GILBERT ASSOCIATES, Inc.
Engineers and Consultants
Power Plant Engineering
Water Supply and Purification
Sewage and Industrial Waste Treatment
Chemical Laboratory Service
New York READING, PA. Philadelphia

GREELEY & HANSEN
Engineers
Water Supply, Water Purification
Sewerage, Sewage Treatment
Flood Control, Drainage, Refuse Disposal
220 S. State Street, Chicago 4

HOWARD R. GREEN CO.
Consulting Engineers
DESIGN AND SUPERVISION OF MUNICIPAL DEVELOPMENTS
Water Works and Treatment—Sewers and Sewage Disposal — Investigations and Valuations
308-10 Bever Bldg., Cedar Rapids, Iowa
Established 1913

Frank E. Harley and Associates
Consulting Engineers
Water Supply and Purification
Sewerage and Sewage Treatment
Industrial Wastes and Garbage Disposal
Municipal Improvements, Town Planning Surveys
Design, Supervision and Operation
260 Godwin Avenue Wyckoff, N. J.

JOHN J. HARTE CO.
Engineers
Waterworks, Sewerage, Treatment Plants, Gas Systems, Street and Storm Drainage, Improvements
Public Buildings, Airports
ATLANTA, GEORGIA

HAVENS AND EMERSON
W. L. Havens C. A. Emerson
A. A. Burger F. C. Tolles F. W. Jones
H. H. Moseley J. W. Avery
F. S. Palocsay E. S. Ordway
Consulting Engineers
Water, Sewerage, Garbage, Industrial Wastes, Valuations—Laboratories
Leader Bldg. Woolworth Bldg.
Cleveland 14, O. New York 7, N.Y.

HAZEN AND SAWYER
Engineers
Richard Hazen Alfred W. Sawyer
Water Supply and Sewage Works
Drainage and Flood Control
Reports, Design, Supervision of Construction and Operation
Appraisals and Rates
110 East 42nd Street New York 17, N.Y.

HILL & HILL
Engineers
Sewage and Waste Disposal,
Water Supply and Filtration,
Dams, Reservoirs, Tunnels,
Airport and Topographic Surveys
Home Office: 8 Gibson St., North East, Pa.

WILLIAM T. HOOPER, JR. CONSULTING ENGINEERS
Water Supply, Sewerage and Sewage Treatment; Municipal, Industrial, and Structural Design; Reports, Supervision, and Laboratory Service
804 Belvidere Street Waukegan, Illinois

JONES, HENRY & WILLIAMS
(Formerly Jones, Henry & Schoonmaker)
Consulting Sanitary Engineers
Water Works
Sewerage and Treatment
Waste Disposal
Security Bldg. Toledo 4, Ohio

Engineering Office of
CLYDE C. KENNEDY
◆ Water Supply
◆ Sewage and Waste Treatment
◆ Sewage Reclamation
CHEMICAL and BIOLOGICAL LABORATORY
SAN FRANCISCO

MORRIS KNOWLES INC.
Engineers
Water Supply and Purification, Sewage and Sewerage Disposal, Industrial Waste, Valuations, Laboratory, City Planning
1312 Park Building, Pittsburgh 22, Pa.

HAROLD M. LEWIS
Consulting Engineer—City Planner
Analyses of urban problems, master plans, zoning, parking, airports, subdivisions, redevelopment.
Reports—plans—ordinances
15 Park Row New York 38, N. Y.

WM. S. LOZIER CO.
Consulting Engineers
Sewerage, Sewage Disposal, Water Supply, Water Purification, Refuse Disposal
10 Gibbs Street Rochester 4, N. Y.

METCALF & EDDY
Engineers
Water, Sewage, Drainage, Refuse and Industrial Wastes Problems
Airfields Valuations
Laboratory
Statler Building
Boston 16

PALMER AND BAKER, INC.
CONSULTING ENGINEERS — ARCHITECTS
NAVAL ARCHITECTS — MARINE ENGINEERS
Surveys-Reports-Design-Supervision-Consultation
Transportation and Traffic Problems
Tunnels-Bridges-Highways-Airports-Industrial Buildings
Waterfront and Harbor Structures, Graving and Floating Dry Docks
Vessels, Boats and Floating Equipment
Complete Soils, Materials and Chemical Laboratories
Mobile, Ala. New Orleans, La. Houston, Texas Washington, D. C.

Millions of Plexiglass Lenses Make Super Highways Safer

Highway Research Abstracts report that new signs are available which depend for their efficiency and durability on the optical clarity and weather resistance of Plexiglas acrylic plastic. Optical clarity is vital, because the surfaces of these signs are actually an unbroken succession of miniature but optically accurate lenses—2,900 of them to the square inch.

These lenses, usually of 0.070-in. focal length, gather the light from approaching headlights, focusing it to pinpoints of light on the flat back surface which is the focal plane of the lenses on the front surface. This light is bounced off aluminum which, evaporated on the back of the plastic provides a reflecting surface. The lenses focus the reflected light into a long, relatively narrow beam and direct it back toward the approaching car. Thus oncoming motorists face signs which appear to be interior-lighted, are visible and legible at maximum distances, yet produce no glare.

• • •

Record Keeping for a Water Department

(*Continued from page* 78)

We make a point of obtaining a spouse's name as well as the signature of the person in whose name the account has been opened, in order to avoid a duplicate account.

In front of each panel a file is maintained alphabetically and by code of Bad Debts. Where no customer account can be located in a file, this record of uncollectible balances is consulted.

Our history file of two cabinets comprising some 23,000 pockets for individual customer history cards is about 95 percent full, whereas our location file with some 35,000 pockets may permit a 15 percent growth within years to come.

We post on any average day between 70 and 75 entries of customer requests for new service, change of address, discontinuation of service, etc. With no one person committed to this job alone, our file personnel are rotated in their duties for an overall view and appreciation of this operation of our department.

With the perspective we now have after a year's operation of the new system, we can say with certainty

that our installation has more than paid off. We have not only relieved a pressing customer service and tight personnel situation but feel gratified that further growth in the city and gains in utility consumption will be met for years to come.

• • •

Heating Expressway Ramps

(*Continued from page 92*)

lines, that must be heavily insulated, from a distant source of supply to the ramps would be prohibitive. The alternative, to construct independent steam generating plants serving each set of ramps, would also be impractical economically.

The steam is piped from a connection in the power company's manhole to a pump house located directly under the viaduct portion of the ramps. For the fourteen ramps now under construction, five pump houses are needed. Each pump house is approximately 22 ft. x 32 ft.; is of concrete; and contains all the equipment necessary, including the converter, circulating pump, solution makeup tank, expansion tank, temperature control and other auxiliary apparatus.

The power company will install reducing valves and meters in their manholes nearest the pump houses. The Massachusetts Department of Public Works will purchase steam from the company on an intermittent basis. Estimating an average use of 400 hours per year, the total consumption for the fourteen ramps will be 5,600,000 pounds of steam per year or 1000 pounds of steam per hour per ramp.

The heating system will be operated manually at the first sign of snowfall or on prediction of snowfall by the weather bureau and it is capable of melting snow at the rate of one inch per hour. This capacity can be increased if necessary. The system may be set to maintain a minimum temperature during unsettled weather and it may be left cold during periods of clear, cold weather without risk of freezing as the circulating fluid is an antifreeze similar to that used in the radiator of an automobile. The condensate is not in danger of freezing due to low temperature in the pump house, as a unit heater is provided to keep the air temperature in the room at a level determined by thermostat setting.

The Massachusetts Department of Public Works believes that the system will prove satisfactory and that with good maintenance it should have a useful life of 25 years.

BOYD E. PHELPS, INC.
Architects-Engineers
Water Supply and Purification
Sewage and Industrial Waste Treatment
Municipal Buildings
Airfields, Power Plants
Reports & Investigations
Michigan City, Indiana — Indianapolis, Indiana

MALCOLM PIRNIE ENGINEERS
Civil & Sanitary Engineers
Malcolm Pirnie — Ernest W. Whitlock
Robert D. Mitchell — Carl A. Arenander
Malcolm Pirnie, Jr.
Investigations, Reports, Plans
Supervision of Construction and Operations
Appraisals and Rates
25 W. 43rd St. — New York 18, N. Y.

THE PITOMETER ASSOCIATES, INC.
Engineers
Water Waste Surveys
Trunk Main Surveys
Water Distribution Studies
Water Measurements and Tests
Water Wheels, Pumps, Meters
New York — 50 Church St.

PRELOAD ENGINEERS INC.
Founded—1934
Consultants in Prestressed Design
Designers of more than 800 prestressed concrete bridges, buildings, tanks and pipe lines erected in the United States since 1934.
955 North Monroe Street, Arlington, Va.

RUSSELL AND AXON
Consulting Engineers
Civil—Sanitary—Structural
Industrial—Electrical
Rate Investigations
408 Olive St., St. Louis 2, Mo.
Municipal Airport, Daytona Beach, Fla.

IRBY SEAY COMPANY
Water Engineers—Water Consultants
Water Supply — Water Treatment
Water-use Survey — Water Wastes
516 Goodwyn Inst. Bldg. — Phone 8-2733
Memphis, Tennessee

SMITH & GILLESPIE
Municipal and Consulting Engineers
Water Supply, Water Purification
Sewerage, Sewage Disposal, Drainage
Refuse Disposal, Gas Systems, Power Plants
Airports
Jacksonville — Florida

FOR RATES FOR THIS SPACE
Write
PUBLIC WORKS MAGAZINE
310 East 45th Street — New York 17, N. Y.

SPANSKI and WILLIAMSON
Engineers — Geologists
Groundwater Exploration
Investigations and Reports
P. O. Box 151 — Springfield, Illinois

STANLEY ENGINEERING COMPANY
Consulting Engineers
Airports—Drainage
Electric Power—Waterworks
Sewerage—Valuations—Rate Studies
Municipal Buildings
Hershey Building — Muscatine, Ia.

ALDEN E. STILSON & ASSOCIATES
Limited
Consulting Engineers
Water Supply, Sewerage, Waste Disposal
Bridges—Highways—Industrial Buildings
Studies—Surveys—Reports
Surveys, Reports, Appraisals
209 So. High St. — Columbus, Ohio

UHLMANN & ASSOCIATES
PAUL A. UHLMANN — H. E. BONHAM
CARL E. KUCK — NYE GRANT
Consulting Engineers
Sewage and Industrial Waste Treatment
Water Supply and Purification
1441 N. High St. — Columbus 1, O.

J. STEPHEN WATKINS
J. S. Watkins — G. R. Watkins
Consulting Engineers
Municipal and Industrial Engineering, Water Supply and Purification, Sewerage and Sewage Treatment, Highways and Structures, Reports, Investigations and Rate Structures.
251 East High Street — Lexington, Kentucky
Branch Office
901 Hoffman Building — Louisville, Kentucky

WHITMAN, REQUARDT and Associates
Engineers — Consultants
Civil—Sanitary—Structural
Mechanical—Electrical
Reports, Plans, Supervision, Appraisals
130 St. Paul St., Baltimore 2, Md.

NOW
is the time to send your reservation in for space in this directory. Rates will be sent on request.
Write
PUBLIC WORKS MAGAZINE
310 East 45th St.
New York 17, N. Y.

ROBERT AND COMPANY ASSOCIATES
Architects and Engineers
ATLANTA
WATER SUPPLY • SEWAGE DISPOSAL • INCINERATORS • POWER PLANTS

PUBLIC WORKS
EQUIPMENT NEWS

Published Monthly **August, 1954**

12 New Heavy Duty Motor Trucks Introduced by IHC

TWELVE additional new International cab-over-engine motor trucks, the heavy-duty CO-190, CO-200, and CO-220 series, have been introduced by the motor truck division, International Harvester Company. R. M. Buzard, manager of sales, said there will be four models—each available in five wheelbases—95, 111, 123, 135, and 153 inches—in each of the three new series. CO-190 series range from 21,000 to 25,000 pounds GVW; CO-200 series from 24,000 to 29,000 pounds; and CO-220 series from 26,000 to 30,000 pounds. Each series includes a Roadliner tractor model with gross combination weight ratings of 50,000, 55,000, and 65,000 pounds, respectively.

Design of the new COE models features a 78½-inch bumper-to-back-of-cab dimension, making the trucks especially adaptable for tractor-trailer service in areas where regulations limit overall length. In over-the-road operation, the short-coupled cab-over-engine models can be used with 35-foot semi-trailer equipment well within the 45-foot limit.

Greater safety, comfort, and convenience are provided in the cab. The driver, being located far forward, has an unusually unobstructed view to both right and left at all intersections.

Four new heavy-duty trucks, the 220 series, powered by a new high-torque, valve-in-head, 201-horsepower gasoline engine, have also been introduced. The new trucks are the 220, 221, 222 Standard models, and the 225 Roadliner. The new engine is the Royal Red Diamond 501, which delivers 430 lb.-ft. of torque at 1,200 to 2,000 rpm. This is the latest and most powerful of the 14 International-built motor truck engines. It delivers maximum gross horsepower of 201 at 3,000 rpm. Displacement is 501 cubic inches. It is not available with LPG fuel system.

Engineering advances include: A new carburetor of four-barrel design; a precision-set block, sleeveless type, of special alloy; valves are sodium-cooled, stellite-faced, slo-roto type. Standard transmission is five-speed with over-drive; optional transmissions available include five-speed with direct-in-fifth or eight-speed progressive shift. Wheelbases are 142, 157, 175, and 193 inches.

How to Find Thickness of Overburden

For determining the depth to bedrock, analyses of fill materials, location of water-bearing strata and similar other subsurface determinations, the SIE refraction seismograph has been very successful, and is said to have proven more accurate than core drilling. Also, less time and cost are involved in getting the facts, which can be presented in continuous horizontal and vertical profile. Only two men are required to transport and operate the entire system. Fine for foundation work, bridge sites, highways and airports, dams, tunnels, and many other places. For more information on the application of seismic equipment to public works problems, write Southwestern Industrial Electronics Co., 2831 Post Oak Road, PO Box 13058, Houston 19, Texas, or circle No. 8-1 on the coupon.

Investigating subsurface conditions by means of the SIE Seismograph unit

• • •

A new super hole-a-matic is announced by Multi-Matic Corp., Van Nuys, Calif., that will dig holes up to 16 inches in diameter. This machine operates easily in all types of soils, and can be used for soil testing, tunneling, digging of concrete pier holes, pipe line installations, etc. It is portable and fits easily into a car trunk or on a light pick-up truck.

Dozer-Rooter for County and City Problems

This dozer-rooter, which consists of a tooth shank housing which mounts on the moldboard of a bulldozer by means of a special clamp and adapters, fits all popular sizes of heavy-duty dozers. It has four depth adjustments; and points are replaceable. Rooters can be attached singly or in pairs and the operator can rip, root and bulldoze at the same time. It is especially fitted for boulder and stump removal; land clearing; ditch work; tearing up old pavement; ripping and handling overburden or cutting seamy rock; roadbuilding; initial cuts in rock, boulders and dirt; and for many other jobs. A four-page folder, No. 194-A, illustrates and describes how it works. Write to Electric Steel & Foundry Co., 2141 NW 25th Ave., Portland 10, Ore., or circle No. 8-2 on the coupon.

Smaller Dozer-Rooter models used on 40 to 70 hp tractors

Working Capacity of Galion Variable Weight Rollers Increased by Torque Converter Drive

Four models of the Galion variable weight tandem roller are now being supplied with the "Roll-O-Matic" drive, which is a combination of a fluid drive and a torque converter. It is stated that at least 10 percent more surface can be rolled per day under any conditions because of the wide range of working speeds available, the faster and smoother reversing at the end of each pass and the automatic maintenance of correct rolling speed. Tests are said to show a saving in fuel up to 25 percent. There is no clutch and gear shift; instead the operator sets a control lever and the engine adjusts automatically to the driving power required to maintain the predetermined uniform roller speed. It is possible to set

Galion tandem rollers have new drive

and maintain rolling speeds of 0.8 to 5.5 mph. Engine braking power is available on down grades just as with the mechanical gear shift. This drive is available on 5-8, 8-10½, 8-12 and 10-14 ton rollers with either gasoline or diesel power. More from Galion Iron Works & Mfg. Co., Galion, Ohio, or circle No. 8-3 on the coupon.

Steel Straps Simplify Mounting Street and Traffic Signs

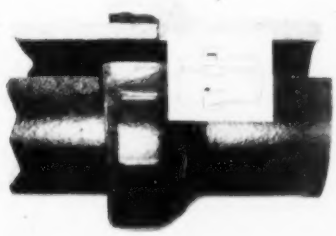
A low cost, versatile and convenient way of permanently binding street, highway and traffic signs to all types of standards is offered by the Steelbinder method. Corrosion-resistant strap is tied tightly around any shape object with the durable strapping tool. Because of the ease of operation, maintenance men can erect signs in cold weather without removing gloves. Secure bindings may be made around concrete, steel or wood standards of all sizes. Complete strapping kits are available which contain all tools and materials needed on the job.

Examples of street name and traffic signs strapped to a steel standard

For more information write to A. J. Gerrard & Co., 1950 Hawthorne Ave., Melrose Park, Ill., or circle No. 8-5 on the coupon.

Mechanical Joint for Vitrified Clay Pipe

This is a push-type joint, based on the ball and socket principle. It consists of a plastic ring die cast electrically in the bell of the pipe,



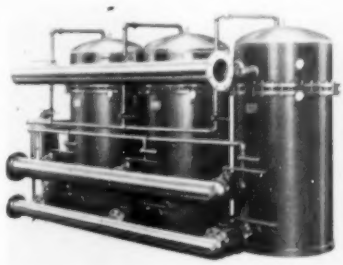
Amvit push type joint has cast rings of plasticized resins molded to pipe

and a plastic ring also die cast electrically on the spigot. The bell ring has a concave exposed surface; the spigot ring a convex exposed surface. The joint material is impervious to most all acids, alkalies and industrial waste compounds. The joint also gives maximum flexibility to the line, and will withstand pressure above 30 psi. Laying is greatly speeded, and it is said that a 50-ft. line can be laid in 15 minutes. Sizes are 4-inch through 8-inch. More from American Vitrified Products Co., Cleveland, Ohio, or circle No. 8-4 on the coupon.

Industrial motor sweepers. Wayne Mfg. Co., Pomona, Calif., has acquired Line Manufacturing, Inc., Los Angeles, Calif., manufacturers of industrial motor sweepers. They will be marketed under the Wayne name and will complete a full range of sweeping equipment, from the smallest type motorized sweeper through the large 3-cu. yd. capacity Wayne street sweeper, used by municipalities. Wayne also manufactures mechanical leaf loaders. The various Line models include five basic units. The Model LS-2 has 4.5 cu. ft. capacity; capacity and power increase through the Model LS-6, 15 cu. ft. capacity; and the DustVac, which is a revolutionary vacuum dust control.

Filter Keeps Swimming Pool Water Crystal Clear

Filter units of the diatomite type are available for pools from 50,000 gallons up to more than a million gallons. These use the "poro-stone" filters, with filter-aid application and backwash equipment. Backwashing is accomplished by simply turning a valve. When more than one filter is in service, any one or more may be precoated or backwashed while the others remain in service. Period between cleanings has been greatly increased. Complete information from R. P. Adams Co., Inc., Buffalo, N. Y., or circle No. 8-6 on the coupon.



Battery of three Adams SPF diatomite type filters for swimming pool water

• • •

The Portafone Can be Important in Civil Defense

A new emergency radio tool, the "Portafone," greatly expedites transmission of messages in civil defense; and it can have application in many every-day jobs. It was used most successfully in Chicago's recent civil defense test to transmit messages from the district report center to a mobile radio for relaying to headquarters. This is a 2-way unit. More information from Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill., or circle No. 8-7 on the coupon.

Tork-master valve operating units. These electric valve operators are designed for all types of conventional gate, globe, plug, butterfly and other valves in sizes for 2½ ins. upward. The basic design provides for a wide range of operating speeds, output torque and length of travel to accommodate various valve designs and operating conditions. Series "A" Tork-Master operating units are manufactured in three basic sizes with ¼ to 3 hp motors. McBain Corp., subsidiary of Harvill Corp., 6251 W. Century Blvd., Los Angeles 45, Calif.

A road danger lamp, the Chalwyn, is manufactured by Wm. W. Lee & Son, 20 East Jackson Blvd., Chicago 4, Ill. This lamp, constructed of heavy 22-gauge steel-plate, may be used on the ground or suspended; it is fitted with three red bulls eye lenses. Weight, 5 lbs.; height to top of handle, 19 ins. It is wind and rain proof, has a chimneyless burner and removable fuel tank (for filling ease).

Heavy Duty Expansion Joint Cleaner and Abrader

When properly mounted, it is claimed that this tool will clean and abrade pitch-filled expansion joints at the rate of 2½ miles an hour; and rubber asphalt or synthetic filled joints at 1½ miles an hour. Also, by mounting on a mandrel that is adjustable vertically, the abrader can work at any angle to 90°. Side walls of the joint can be abraded to the concrete without fracturing or widening the joint, thus eliminating the necessity of using larger quantities of joint-filler. The motorized unit is highly maneuverable and easily transported. The cutters are easy to replace. This tool also has many applications in scraping, shredding, scaling and cleaning. More from Asbury Corp., Ft. Lauderdale, Fla., or circle No. 8-8 on the coupon.

High speed abrading tool cuts filler from expansion joints in pavements

"Deep Beam" Highway Guard Rail Mounts Without Brackets

To provide maximum protection against damage to vehicles and injury to occupants, Tuthill has brought out a deep beam guard rail that is mounted directly on each post with a single bolt, and does not require brackets, end tension, anchor rods or "dead men." Vehicles striking the rail cannot "pocket" behind a post but are automatically deflected back to the pavement at a minimum angle. Also, the curved surface provides maximum visibility for safer night, fog and rainy weather driving. For details, write to Tuthill Spring Co., 760 West Polk St., Chicago 7, Ill., or circle No. 8-9 on the coupon.

New guard rail gives maximum safety

Small Self-Powered Service Station For Maintenance of Heavy Equipment

A small self-powered, self-propelled service station for maintenance of heavy equipment is available. This is powered by a 6 hp Wisconsin engine. The entire unit, including compressor, air tank, space for three 100 lb. drums, tool trays, service hoses, and lubricant pumps is only 31 ins. wide, making it easy to take the unit close to the equipment to be serviced. It travels over rough ground and up steep slopes, making it adaptable for both indoor and outdoor use. Complete details from the Prime-Mover Co., Muscatine, Iowa, or circle No. 8-10 on the coupon.

Lubrication of equipment is made easy with this mobile, self-propelled unit

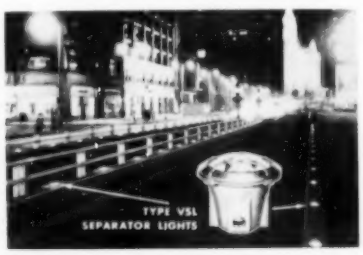
Speeds Up Meter Reading As Much As 50 Percent

The manufacturer says "Here is the solution to 90 percent of your water meter register problems." This is accomplished by sealing water meter registers, including change gears, with a virtually non-breakable magnifying type register box completely filled with a non-freezing transparent fluid. This is claimed to eliminate condensation or fog, stuck registers, dirty faces or numerals, packing troubles, register corrosion, broken glasses, 99 percent of reading errors. More from Fog-Tite Meter Seal Co., 2839 W. 58th St., Seattle 7, Wash., or circle No. 8-11 on the coupon.

A heavy-duty bucket loader, with hydraulic operated swivel discharge conveyor, has been announced by N. P. Nelson Iron Works, Inc., Clifton, N. J. Available in two models, the P-11B mounted on rubber tires, weight 17,500 lbs.; and the Q-11B mounted on crawlers, weight, 18,700 lbs. A loading capacity up to 4 cu. yds. per minute is claimed. Complete hydraulic system, anti-friction bearings, avalanche plates, spring mounted bumpers and extra-heavy conveyor belt are included as standard equipment. Boom tilts down for easy highway transport.

Flush-Type, High-Visibility, Non Glare Traffic Separator Light

This new weather-proof, vapor-tight, traffic separator light is designed for flush mounting in the raised horizontal surfaces of curbs, safety islands and walks. An inside frosted lamp, an Alzak parabolic reflector, and a 5⅜-inch stepped lens provide the combination of a flush fixture with a beam which can be seen clearly by motorists from a distance (where the angle of observation is very low) and still not have an objectionable glare at close range. Further details from Pyle-National Co., Chicago 51, Ill., or circle No. 8-12 on the coupon.



Flush-mounted traffic separator light for curbs, safety islands and walks

If You Want to Ease that Water Shortage

A new control device designed to alleviate municipal water shortage conditions cuts off all flow from an outside faucet whenever the water pressure drops to a critical level in that area. When satisfactory pressure returns, the valve, which can be preset to any desired level, snaps open to permit water flow. If all homes in an area are equipped, an automatic and effective "no sprinkling" ban goes into effect whenever absolutely necessary—and only then. The valve can be incorporated in a faucet or can be supplied in the form of a separate unit which is attached to outside faucets. An adjusting screw permits pressure settings through a 100-lb. range, with 5 percent accuracy range. Models are available which are wire sealed. Though these valves are by no means a complete cure for water shortages, they will relieve the worst aspects of the problem when dry weather greatly increases the demand for lawn water. For more information write Duroset Corp., 18512 Detroit Ave., Cleveland 7, Ohio, or circle No. 8-13 on the coupon.

Galion Model 118 motor grader is powered with either 115 or 125 hp diesel engine

Piston Operated Water Control Valve

This valve for water control in mains, at filtration plants and for many other uses is claimed to have the following advantages: Self-powered—the valve takes all of its operating power from the line content itself; there is no electric motor, no manpower and no outside power is required. Remote control—the valve may be opened and closed, as often as desired, and from as far as a mile away. No water hammer effect—because the valve closes against the line flow and opens with the line flow there is no water shock when closing. Full flow—the loss in pressure through the valve is less than 1 percent. Valves can be furnished in cast iron, steel bronze or other materials, and they may be installed in any position in the line, from full right side up to full upside down. The single control is an ordinary 3-way valve, which may be hand-operated from several hundred feet away, or solenoid operated (110-volt AC or 6 volts DC or other) from any distance away. More from McRae Corp., 621 So. Spring St., Los Angeles 14, Calif., or circle No. 8-15 on the coupon.

Self-Sweeping Paint Striping Machine

A new self-sweeping Mark-A-Zone paint striping machine removes interfering objects just ahead of the paint stripe. A spreader removes excess film from beads when

Stripes up to 6" wide may be made with this new machine

striping with beaded paint. Gravity fed, it spreads a thick, clean line of paint in straight lines or circles. Guide wheels can be raised for curves and close places. Made in capacities of 4½ or 6 quarts of paint. Sketches and measurements for easy layout and striping are available. Further information from S. B. Beugler Co., 3667 Tracy St., Los Angeles 39, Calif., or circle No. 8-14 on the coupon.

A heavier and more powerful engine for the Galion Model 503 grader has been announced by Galion. This Continental 6-cylinder gasoline engine, 50 hp at 1500 rpm, is important in the more efficient operation of the many attachments available for this grader, including rear end loader, windrow eliminator, hydraulic shiftable moldboard, scarifier, bulldozer, "V" and straight blade snow plows, leaning front wheels, and hydraulic circle reverse. Galion Iron Works & Mfg. Co., Galion, Ohio.

The model HRC "Payloader" is another addition to the line of torque-converter-driven tractor shovels of the Frank G. Hough Co. This is a 4-wheel drive unit with a bucket capacity of 1 cu. yd. struck-load and 1 1/3 cu. yd. payload (heaped). Greater production is claimed with the torque-converter drive and much less effort and concentration by the operator. Frank G. Hough Co., 761 Seventh St., Libertyville, Ill.

• • •

Utilities Dipper Now Available For the Hydrohoe

A new utilities dipper is now available for the Bucyrus-Erie Hydrohoe which is designed to provide

a shorter dipper which can be rotated within a smaller arc than the standard dipper. This has an overall width of 22 ins. With side cutters, the cutting width is increased to 26 ins. It can dig a hole 5 ft. deep and only 36 ins. long, with vertical walls and comparatively flat bottom. Additional information from Bucyrus-Erie Co., South Milwaukee, Wis., or circle No. 8-16 on the coupon.

Classified Advertising and Used Equipment For Sale

AVAILABLE

SUPERINTENDENT OF PUBLIC WORKS

Graduate Engineer, fifteen years experience in Municipal Administration, Water, sewers and sewage disposal, roads, buildings, etc. Age 45, married and seeks new location.

Write to:

Post Office Box #71
Trenton, New Jersey

ANNOUNCING CIVIL SERVICE EXAMINATION FOR SUPERINTENDENT CITY WATER WORKS CEDAR RAPIDS, IOWA

Qualifications: Age 35 to 50 years. Engineering degree and ten years experience or BS degree and 12 years experience.

Starting Salary: $7,500.00.

WRITE CIVIL SERVICE COMMISSION, CITY HALL, CEDAR RAPIDS, IOWA, FOR APPLICATIONS AND INFORMATION. APPLICATION DEADLINE AUGUST 25, 1954.

REPRESENTATION OFFERED

Engineering and Manufacturing Representative Company with offices to be located in Denver wishes to represent firms in the water works and sewerage field in the states of Colorado, Wyoming, Utah, Idaho, Montana, Nebraska, and North and South Dakota.

Write or Wire

Joe Beck, Engineering
P. O. Box 119 Cheyenne, Wyo.

MAINCO DISTANCE MEASURING WHEEL

ONE MAN and a MAINCO can beat 2 MEN WITH A CHAIN

Send for descriptive folder today

THE MAINTENANCE CO., INC.
Dep't. E, 453 W. 42nd St., New York 36, N. Y.

WANTED

ASSISTANT PLANTS SUPERINTENDENT

To take responsible charge of Sewage Treatment Plants. Must be available August 1, 1954. Send complete resume of qualifications to:

C. E. Steeler, Director
Personnel & Public Relations
Water & Sewer Dept.
Room 402, City Hall
Tulsa, Oklahoma

STOP *that* WATER

With FORMULA NO. 640

A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—holds 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs: Applies quickly—no mixing—no cleanup—no furring—no membranes. Write for technical data—free sample.
HAYNES PRODUCTS CO., OMAHA 3, NEBR.

The Following Books and Reprints May Be Ordered Through Our Book Department

Sewage & Sewage Treatment.... by W. A. Hardenbergh	$6.50
Water Supply & Purification.... by W. A. Hardenbergh	$6.50
What You Should Know About Soil Engineering ..... by Leo Ritter, Jr.	$1.00
Handbook of Trickling Filter Design	$1.00
Patching Pavements Properly ... by G. E. Martin	$1.00

All Books & Reprints Sold On a Money Back Guarantee

Send Your Check to:

Book Department
Public Works Magazine
310 East 45th St.
New York 17, N.Y.

For Information Regarding Rates In this Section

Write To:
Classified Ad Department
Care of this Magazine

"The Magazine Where Your Advertisement Reaches The Largest Audited Engineering Circulation In Cities and Counties."

A Meter for Indicating and Recording pH

This is a panel-mounted automatic pH meter, very compact and able to be serviced by personnel right on the job. It will accommodate virtually any combination of meter and recorder ranges and the recorder pH scale can be shifted up or down, expanded or compressed. Circuits of this meter are designed in three plug-in circuits which can be replaced instantly with spares without disturbing panel connections, insuring uninterrupted control of processes. A most interesting bulletin, 342-91, is available on request from Beckman Instruments, Inc., South Pasadena, Calif., or by circling No. 8-17 on the coupon.

Tiller Rake for Better Landscaping and Maintenance

For park and lawn work this tiller rake does four jobs in one: Scarifying, leveling, grading and raking are all accomplished with the same instrument, giving perfect preparation in the shortest possible time, with substantial savings in tractor operation and man-hours. The unit is especially well adapted to the uniform spreading of cinders, sand, gravel, crushed stone and asphalt mixes in driveways, parking lots and road-building work. In fact, all of its potential money-saving uses have not yet been developed. This tiller-rake is designed to operate with the Ford, Ferguson and other tractors that have a 3-point hydraulic lift system. Complete information from Roseman Tractor Equipment Co., Evanston, Ill., or circle No. 8-18 on the coupon.

Getting Better Turf Along the Roadside

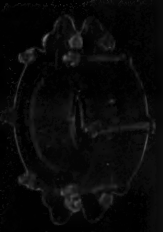
The Renovataire is a new machine, designed to aerate and renovate roadsides. It has 22-inch renovating wheels built in pairs and individually suspended from the drawbar to provide a free floating action that will follow any contour at speeds up to or above 5 mph. Saw-toothed knives, adjustable at 2, 3 or 4-inch depth penetrate the soil with a slicing action. There is small surface disturbance and only a minor amount of soil is removed; but the machine is claimed to be of great value in maintaining a healthy turf by getting air, moisture and fertilizer down to the root zones. Full data from Soilaire Industries, 1208 2nd Ave., South, Minneapolis, Minn.; or circle No. 8-19 on the coupon.

FOR REPAIRING BELL AND SPIGOT JOINT LEAKS...

SKINNER-SEAL
Bell Joint Clamp for stopping bell and spigot joint leaks under pressure. Gasket is completely sealed: at bell face by Monel Metal Seal band — at spigot by hard vulcanized gasket tip. 2" to 42".

AND BROKEN MAINS

SKINNER-SEAL
Split Coupling Clamp. One man can install in 5 to 15 minutes. Gasket sealed by Monel band. Tested to 800 lbs. line pressure. A lasting repair. 2" to 24" incl.



M. B. SKINNER CO.
SOUTH BEND 21, INDIANA, U.S.A.

What you should know about

SOIL ENGINEERING

by LEO J. RITTER, JR.

SOIL engineering is the practical application of engineering principles to problems involving the use of soil, either in its natural condition or as a construction material. In this authoritative booklet all phases of soil engineering are treated in simple, easily understandable language. Full information is provided on basic soil properties, classification systems, field and laboratory tests, frost action and compaction. Liberally illustrated and containing many special charts and graphs to assist the engineer in his work.

ORDER from Book Department, PUBLIC WORKS, 310 East 45th Street, New York 17, N. Y. Only $1.00 per copy.

Air Filter to Protect Pneumatic Instruments

A compact air filter, designed to keep dirt, oil, water and other undesirable materials out of pneumatic instruments has been announced by Foxboro. This filter, which is only about 4 by 8 ins. in size, can be mounted in a supported line or fastened to a wall. The filter sleeve, of moisture resistant cellulose, removes particles as small as 40 microns. It is inexpensive and easily cleaned. Filter capacity is 4 cfm; sump capacity is 12 cu. ins.; filtering area is 21.2 sq. ins.; maximum working pressure is 150 psi; supply and outlet connections are ¼-in. Ask for Technical report TI 29-A-92a from Foxboro Co., Foxboro, Mass., or circle No. 8-20 on the coupon.

"Orthosolv", a water-dispersible chlorobenzene for control of obnoxious odors is announced by Solvay. It is claimed that the chlorobenzenes in this product act in three ways to control undesirable odors: they effectively mask existing obnoxious odors; control the growth of the micro-organisms that produce sulphides with their characteristic strong, unpleasant odors; and prevent the growth of fungi that speed the decomposition of waste materials which causes offensive odors. It is also said to be effective even when used in solutions as dilute as one part in 100 parts of water, and can be sprayed on the affected areas with any normal pumping equipment. Solvay Sales Div., Allied Chemical & Dye Corp., 61 Broadway, New York 6, N. Y.

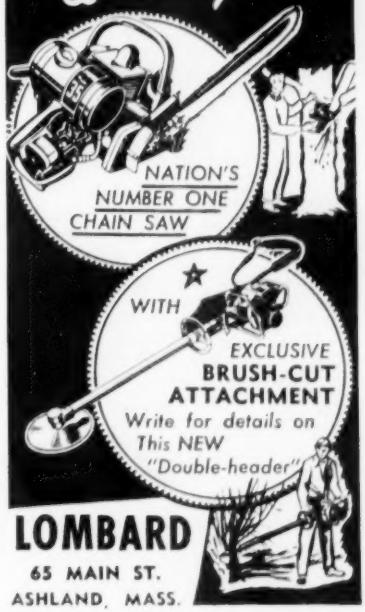
George E. Martin, Highway Engineer and Consultant

George Martin, Highway Consultant to PUBLIC WORKS MAGAZINE, and nationally known highway engineer, died July 5, following a heart attack suffered about a month previously. Mr. Martin, before his retirement a couple of years ago, had long been consulting engineer to the Tarvia Division of the Barrett Co. Since then he has been consultant in highway engineering matters to PUBLIC WORKS. His wide knowledge and his remarkably fine personality combined to make him one of the leading highway engineers of the country. He will be missed by many, but by none more than by his associates on PUBLIC WORKS.

M - SCOPE PIPE-LOCATOR

New Model
"Electronic Witch"
Can be used to advantage over highly conductive ground
• IMMEDIATE DELIVERY
• FULLY GUARANTEED
Send For Free Literature!
PRICE ONLY $162.50
FISHER RESEARCH LAB., Inc.
PALO ALTO CALIF.

Cuts Timber and Brush Quickly!



LOMBARD
65 MAIN ST.
ASHLAND, MASS.

INCREASE SEWAGE PLANT CAPACITY WITHOUT CAPITAL COST!

WHAT IS IT?

- BIONETIC is a dry powder of preserved beneficial groups of micro-organisms that accelerate natural biological action.

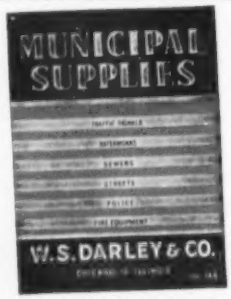
WHAT DOES IT DO?

- BIONETIC can save money on sewage plant problems including odor control, increased sludge digestion capacity, and scum blanket control.

INTERNATIONAL ACCEPTANCE:

- BIONETIC is successfully used by hundreds of municipalities, industries, resorts, and institutions.

For FREE Literature Write:
A. J. Krell, technical director
Reliance Chemicals CORPORATION
P. O. BOX 6734 HOUSTON 5, TEXAS



WRITE TODAY FOR 100 PAGE CATALOG

W. S. DARLEY & CO., Chicago 12

STREET, SEWER AND WATER CASTINGS

Various Styles, Sizes and Weights
Manhole Covers and Steps
Adjustable Curb Inlets
Water Meter Covers
Cistern and Coal Hole Covers
Gutter Crossing Plates
Valve and Lamphole Covers

Write for Catalog and Prices
SOUTH BEND FOUNDRY CO.
Gray Iron and Semi-Steel Castings
SOUTH BEND 23, INDIANA

The Handy Readers' Service Coupon on Page 32 Brings You Latest Information In Equipment and Materials

INDEX OF ADVERTISEMENTS

Abrams Aerial Survey Corp. 135
Aero Service Corp. 41
Alabama Pipe Co. 100
Albright & Friel, Inc. 135
Allis Chalmers Co. ..... 16 & 17
Alvord, Burdick & Howson 135
American Bitumuls & Asphalt Co. 53
American Public Works Assoc. 47
Ammann Photogrammetric Engineers, Inc., Jack 60
Aqua Survey & Instrument Co. 100
Armco Drainage & Metal Prod., Inc. 37
Automatic Signal Division, Eastern Industries, Inc. 109
Ayer-McCarel Clay Co., Inc. 121
Avery Tractor Inc. 44

Badger Meter Mfg. Co. 22
Baker, Jr., Michael, Inc. 135
Bannister Engineering Co. 135
Barber-Greene Co. 43
Barco Mfg. Co. 52
Barker & Wheeler 135
Baughman Mfg. Co., Inc. 57
Bell, Howard K. 135
B-I-F Industries, Inc. 39
Black & Veatch 135
Blaw-Knox Company 18
Blockson Chemical Co. 61
Bogert Assoc., Clinton L. 135
Bowe, Albertson Assoc. 135
Bowerston Shale Co. 121
Bros Boiler & Mfg. Co., Wm. 54
Brown & Blauvelt 135
Brown Company 64
Brown Engineering Co. 135
Buck, Seifert & Jost 135
Buffalo Meter Co. 63
Buffalo Pipe & Foundry Corp. 145
Buffalo Steel Div. H. K. Porter Co., Inc. 108
Builders-Providence 39
Burgess & Nipple 135
Burke, Inc., Ralph H. 135
Burns & McDonnell Engr. Co. 135
Butler Mfg. Co. 6
B/W Controller Corp. 38

Caird, James M. 135
Calgon, Inc. 10
Camp, Dresser & McKee 135
Capitol Engineering Corp. 135
Cast Iron Pipe Research Assn. ..... 8 & 9
Caterpillar Tractor Co. 4, 66, 129
Centriline Corp. 42
Chain Belt Company 101
Champion Corp. 38
Chapman Valve Mfg. Co. 45
Chester Engineers 135
Chicago Pump Co. 3
Clark-Wilcox Co. 48
Classified Ads 142
Cleveland Trencher Co. 147
Climax Engine & Pump Mfg. Co. 50
Clow & Sons, James B. 116
Cole & Sons, Chas. W. 135
Consoer, Townsend & Assoc. 135
Continental Steel Corp. 145
Cotton, Pierce, Streander, Inc. 135
Credle Engineering Co. 135

Darley & Co., W. S. 144
Darling Valve & Mfg. Co. 119
DeLeuw, Cather & Co. 135
Dempster Brothers, Inc. 49
Dickey Clay Mfg. Co., W. S. 121
Dolge Co., C. B. 106
Dorr Company 123
Dresser Industries, Inc. (See Dresser Mfg. Div.)
Dresser Mfg. Div. 115
Dratt Mfg. Co. ..... 24 & 25
du Pont de Nemours & Co., E. I. 64

Ellis & Ford Mfg. Co. 114

Fairbanks-Morse & Co. 12
Federal Sign & Signal Corp. 55
Fisher Research Lab., Inc. 143
Flexible Sales Corp. 127
Foster Engineering Co. 62
Frink Sno-Plows 111

Galion Iron Works & Mfg. Co. ..... 20 & 21
Ganett, Fleming, Corddry & Carpenter, Inc. 136
Gar Wood Industries, Inc. 30
Gilbert Associates, Inc. 136
Gledhill Road Machinery Co. 130
Greeley & Hanson 136
Green Co., Howard R. 136
Greenlee Bros. & Co. 34
Grote Mfg. Co., Inc. 44

Harley & Assoc., Frank E. 136
Harte Co., John J. 136
Hauck Mfg. Co. 36
Havens & Emerson 136
Haynes Products Co. 142
Hays Process Co. 34
Hazen & Sawyer 136
Healy-Ruff Co. 114
Heltzel Steel Form & Iron Co. 27
Highway Equipment Co., Inc. 134
Hill & Hill 136
Homestead Valve Mfg. Co. 26
Hooper, Jr., William T. 136
Hough Co., Frank G. 13

Industrial Materials Co. 121
Infilco Inc. 107
International Harvester Co. ..... 24 & 25
International Salt Co., Inc. 65
Irving Subway Grating Co., Inc. 146

Jaeger Machine Co. 35
Jones, Henry & William 136

Kennedy, Clyde C. 136
Kerrigan Iron Works, Inc. 111
Knowles, Inc., Morris 136
Koehring Co. ..... 46 & 51
Kohler Company 132

Lakeside Engineering Corp. 62
Leopold, F. B. 58
Lewis, Harold M. 136
Link Belt Company 99
Lock Joint Pipe Co. 59
Lombard 143
Lozier Co., Wm. S. 136
Lyle Signs Inc. 132

Maxim Silencer Company 36
McWane Cast Iron Pipe Co. 105
Metcalf & Eddy 136
M & H Valve & Fittings Co. 122
Mid-Western Industries, Inc. 33
Morse Bros. Machinery 102
Mueller Co. 29
Murdock Mfg. & Sup. Co. 46

Natco Corp. 121
National Clay Pipe Mfrs., Inc. 125
Neenah Foundry Co. 110

Oliver Corp. 2
Orangeburg Mfg. Co., Inc. 40

Pacific Flush Tank Co. 19
Pacific States Cast Iron Pipe Co. 105
Palmer & Baker, Inc. 136
Palmer Filter Equip. Co. 48
Permutit Company 117
Phelps, Inc., Boyd E. 137
Pipe.in Construction Equipment Inc. 56
Pirnie Engineers, Malcolm 137
Pitometer Associates, Inc. 137
Pittsburgh Des Moines Steel Co. 31
Pollard Co., Inc., Jos. G. 118
Pomona Terra-Cotta Co. 121
Preload Engineers, Inc. 137

Radiator Specialty Co. 133
Reed Mfg. Co. 133
Reliance Chemicals Corp. 144
Ridge Tool Co. 28
Robert & Co., Associates 137
Roberts Filter Mfg. Co. 58
Royer Foundry & Machine Co. 127
Russell & Axon 137

Seay Co., Irby 137
Skinner Co., M. B. 143
Smith & Gillespie 137
South Bend Foundry Co. 144
Spanski & William 137
Sparling Meter Co. 106
Stanley Engineering Co. 137
Stilson Assoc., Alden E. 137

Tarrant Mfg. Co. 23
Tennant Co., G. H. 104
Texas Vitrified Pipe Co. 121
Thomas Drain Service 50
Trickling Filter Floor Institute 121

Uhlman & Associates 137
U. S. Pipe & Foundry Co. 113

Wallace & Tiernan Co., Inc. ..... Back Cover
Watkins, J. Stephen 137
Westinghouse Electric Corp. ..... 14 & 15
Whitman, Requardt & Assoc. 137
Wolverine Tube Division of Calumet & Hecla, Inc. 11
Wood Co., R. D. 126
Worthington Corp. 103

—Worth Seeing

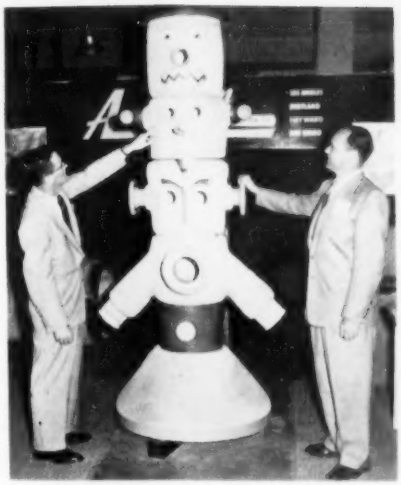
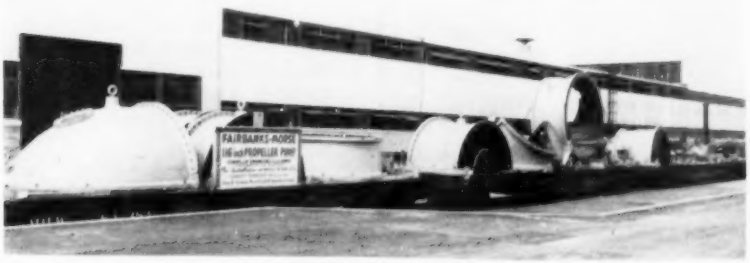


Photo by Hal Kaminski

SOME MONTHS ago we showed you the "Iron Man" of R. D. Wood Company, cast iron pipe makers. Now here is American Concrete Pipe and Construction Company's concrete totem pole at South Gate, Calif. "Low men on the totem pole" are Advertising Manager Jack Watson (left) and Gordon L. C. Scott.

HERE ARE Caterpillar D8 tractors on construction of the great U. S. Air Force base at Thule, Greenland. These are re-diverting the Great Star River back to its original bed, 700 miles north of the Arctic Circle. Look at it and cool off!

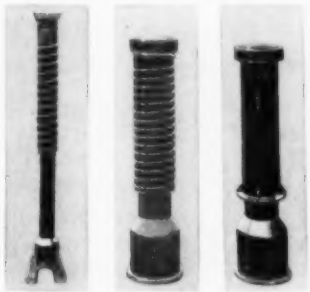
LAYING ASPHALT at 54 feet a minute with a Blaw-Knox (Foote Division) Bituminous Paver on the New Jersey Garden State Parkway near Absecon.



3 FLAT CARS to carry one pump! This picture, taken at Fairbanks Morse's new Kansas City, Kans., plant shows shipment of a 116" propeller pump for installation at Belle Glade, Fla., for the Corps of Engineers, U. S. Army. There were six other such pumps on this job.

BUFFALO MUNICIPAL CASTINGS

are Heavier, more Rugged! Which means years of extra service!



Durability and strength are embodied in every "Buffalo" casting and that means years of extra service that is trouble-free. Each step in the production of a Buffalo Pipe casting is carefully engineered, supervised and controlled — thus producing strong, quality castings to any physical or metallurgical specifications.

For quotations, write to Dept. H

BUFFALO PIPE & FOUNDRY CORP.

BOX 55—STATION B DE 6764 BUFFALO, N. Y.

Longer Protection Life

- Chain Link fabric galvanized after weaving
- Improved welded gates and locking devices
- Extra post and rail ties
- Heavy post caps and barb arms
- H-Section line posts 15% heavier
- Engineered construction

Continental Steel Corp.
Kokomo, Indiana

Please send FREE copy of "Planned Protection"—complete manual on property protection.

Name_____

Address_____

City_____ State_____

CONTINENTAL
STEEL CORPORATION • KOKOMO, INDIANA

KEEP in STEP!

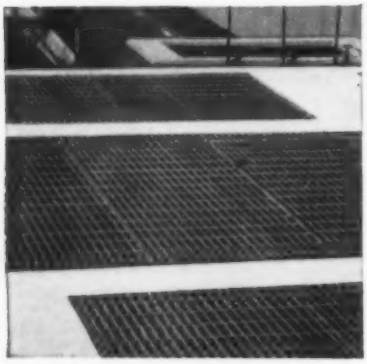
. . . Take Advantage of

SAFETY,
ECONOMY,
DURABILITY,

Every Step of the Way.

...CHOOSE
IRVING GRATINGS

You're on SURE FOOTING with Versatile IRVING RIVETED, WELDED OR PRESSURE-LOCKED OPEN MESH FLOORING . . .



FOR: Walkways, Catwalks, Flooring, Draingrates, Stairways, Stair Treads.

IN: Sewage Disposal Plants, Water Treatment Works, Power Stations, Bus Laundries, and other Public Works Installations.

Specify IRVING GRATING for:

★ Light Weight
★ Simple Installation
★ Self-Draining Features
★ Self-Ventilating Qualities
★ Minimum Maintenance Cost
★ Custom-Built Perfection
★ Prompt Delivery
★ Safety ★ Durability

"A Fitting Grating for Every Purpose"

Ask for Illustrated Catalog

IRVING SUBWAY GRATING CO., INC.
ESTABLISHED 1902

OFFICES and PLANTS at
5053 27th St., Long Island City 1, N. Y.
1853 10th St., Oakland 20, California

WORTH TELLING

by Arthur K. Akers

★ Above you see President Joseph P. Lawlor of General Filter Company, and mayor of Ames, Iowa, presenting a parchment plaque to fellow-Iowan Dale M. Maffitt, president of the Des Monies Water Works who is also the new president of the A.W.W.A. Joe claims the combination makes Iowa the water works center of the world now. Also, his company has added Keith E. Demorest and Conrad E. Lawlor to its staff.

★ Koehring Company, Milwaukee, names D. W. Marchant vice president and general manager of Koehring Southern Company, Chattanooga.

★ Cooper-Bessemer Corporation's E. R. Bonnist announces that Robert F. Lay is now their assistant general sales manager.

★ Kenneth O. Williamson becomes sales manager of Osgood-General Company's line of excavators and materials handling equipment.

Mr. Borbonus

★ William E. Borbonus has been elected president, and Kenneth K. Kirwan vice president and chief engineer of Centriline Corporation, New York. Former president James P. Cummins goes to the sales department of the parent company, Raymond Concrete Pile Company.

★ Spencer Manufacturing Company of Ohio has been purchased by a group of Chicago industrialists headed by J. A. Roesch. Production of heavy duty axles will be increased.

★ A tip of our hat to Editor Don Bloodgood of the Purdue University *Sanitary Engineering News* for his June kind words about our new four color process illustrations in articles.

★ Baker-Lull Corporation adds John A. Miller as southern district

Mr. Reed

Mr. Miller

manager, in Atlanta; and Walter L. Reed as southwestern ditto, in Tulsa. Both will push sales of the 4-wheel drive Shoveloader.

★ Fred Schuchman is now assistant general sales manager, Homestead Valve Manufacturing Company, Coraopolis, Pa.

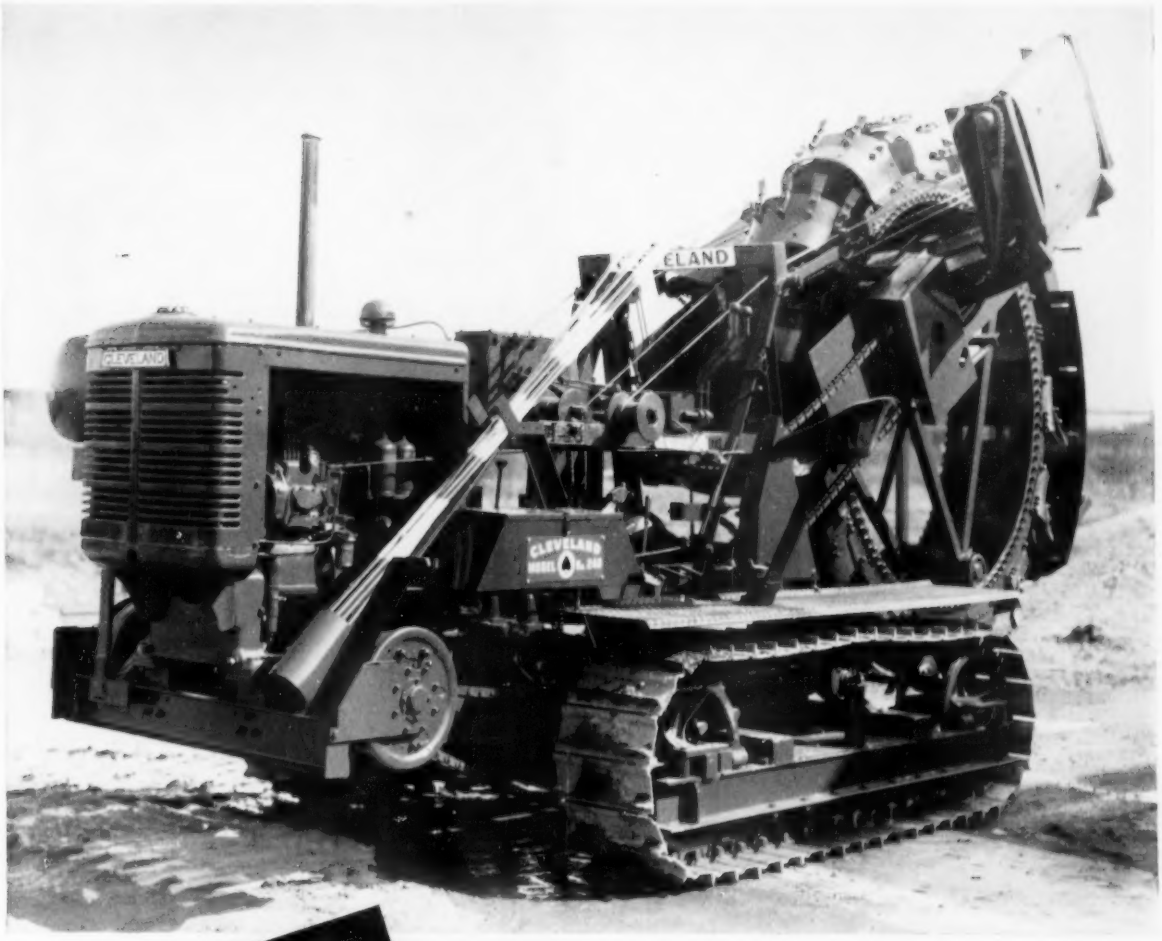
★ Worthington Corporation appoints Fenmore E. Dunn general manager of its reorganized vertical turbine pump division, at Succasunna, N. J. works.

★ Had we an inch left, we would fill it here with a picture of Wayne Manufacturing Company's eastern division plant in Newark N. J. Pomona, Calif., remains headquarters.

★ Amos, after narrow escape at a railroad crossing: "How come, boy, you blow your horn? It ain't do no good *now*."

Shaken Sam: "Dat wa'n't my horn—dat was *Gabriel's* you hear."

—*Dickey Data*



A Great New CLEVELAND

The Model 240

DIGS 20″ - 36″ WIDE, DOWN TO 6′3″ DEEP

● This powerful new trencher possesses all the famous time-proved CLEVELAND advantages—plus valuable new features that make it the finest trencher of its size and capacity ever built.

It is built to deliver—*is now delivering*—outstanding digging performance . . .

For Trench Work of Every Kind

PIPELINES • UTILITIES • DRAINAGE • IRRIGATION, ETC.

Ask Your Local Distributor for Bulletin S-119, or Write:

THE CLEVELAND TRENCHER CO. • 20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

CLEVELAND

...BY NATURE

Carefully designed, too, are the dependable W&T Chlorinators which are familiar sights in thousands of installations all over the world.

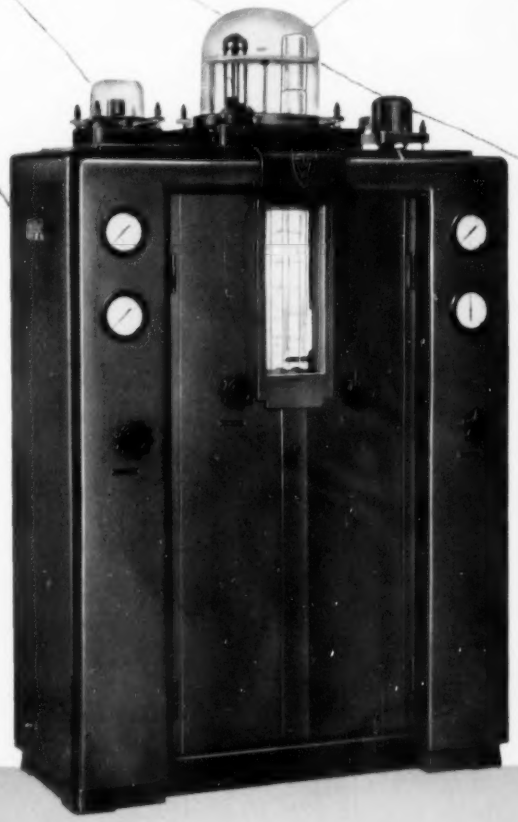
For example — the W&T Visible Vacuum Principle which, by means of a glass bell jar, permits simple, visual checks on proper chlorinator performance.

And, for another — the inherent safety and economy of W&T Chlorinators, which are available with controls and accessory equipment to meet exactly each specific chlorination problem.

Behind these and many other design features is a nation-wide field organization, which, by "nature," is resourceful and technically skilled. The services of this organization are designed to give you — in the most efficient manner possible — the practical and proved results of a continuing quest for the best in chlorination equipment.

If, by nature, you're skeptical, you can easily prove it to yourself by passing along your own particular chlorinator problem. You'll hear from us promptly — and without obligation, of course.

S-84



WALLACE & TIERNAN

COMPANY INC.

25 MAIN ST BELLEVILLE 9, N. J.